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Edited by
MARY HARVEY

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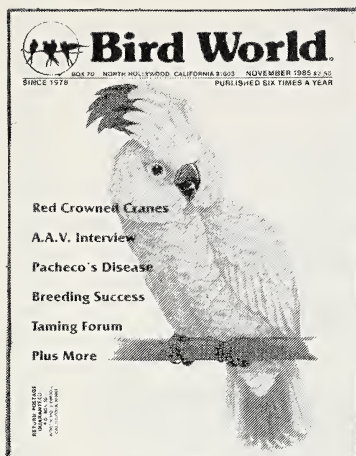
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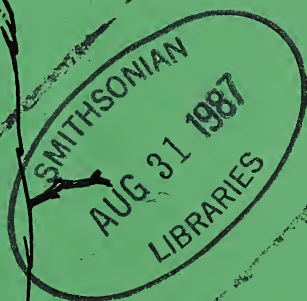
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THE AVICULTURAL MAGAZINE welcomes original articles that have not been published elsewhere and that essentially concern the aviculture of a particular bird or group of birds, or that describe their natural history. Articles should be preferably typewritten, with double spacing, and the scientific names as well as the vernacular names of birds should be given. References cited in the text should be listed at the end of the article. Line drawings should be in Indian ink on thick paper or card; black and white photographs which illustrate a particular point in the article will be used where possible and should be clearly captioned. If authors wish their eventual return, they must say so when submitting the article and write their name on the back of each photograph.

ADDRESS OF EDITOR

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Oliver Knapp

Andean Condor chick at Chester Zoo, 26 days old

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CHESTER ZOO A REVIEW OF THE 1985 BREEDING SEASON

By ROGER WILKINSON
(Curator of Birds)

Whereas the summer of 1984 was exceptionally dry and sunny, that of cold 1985 never really arrived. Indeed, the spring and summer months were cold and exceptionally wet. This affected our breeding season, especially with respect to some species of paddock birds and parrakeets.

The first birds to lay (in fact eggs were laid in late December 1984) were the Cereopsis Geese *Cereopsis novaehollandiae*. As usual, the first clutch of eggs was removed for artificial incubation, but as has happened all too frequently, none was reared. Only one gosling has been reared from this pair in five seasons; we have tried both artificial incubation and parent incubation but all but one gosling have died either prior to hatching or as weak goslings shortly after hatching. It would appear that our only option may be to try different pairings - the problem is an understandable reluctance of other parties to enter into exchanges with either of this problem pair.

The Black Swans *Cygnus atratus* also lay their first clutch in late winter/early spring. As is our normal practice, the first clutch was removed for artificial incubation and two cygnets were successfully reared. The parents did even better in rearing six cygnets from their second clutch and later in the year we were able to send five immature Swans to start a new colony at Whipsnade Zoo. Our recently acquired Red-breasted Geese *Branta ruficollis* and Hawaiian Geese *Branta sandvicensis* were probably still too young to lay and other species may have been inhibited by the extremely cold spring weather. However, we were successful with Laysan Teal *Anas platyrhynchos laysanensis* and Mandarin Ducks *Aix galericulata*, two species of waterfowl which are rare in their native habitats but are now both well

established in captivity. Eleven Laysan Teal and 24 Mandarin Ducks were reared as well as good numbers of Carolina Ducks *Aix sponsa*, Rosy-billed Pochard *Netta peposaca* and Chiloe Wigeon *Anas sibilatrix*.

Ratites were far less successful than in 1984. Owing to the foul cold weather, the earliest laid Ostrich *Struthio camelus* eggs were removed for artificial incubation. Five Ostriches hatched but only two survived. Both of these had very slow growth rates compared to those of the previous year. After trying our female Emu *Dromaius novaehollandiae* with two different males we still await any signs of breeding activity and I am beginning to wonder whether, in fact, we do have a true pair. Ratites, other than Ostriches, can be quite difficult to sex and do not always follow the text book patterns. We obtained two young Rheas *Rhea americana*, considered females, from Colwyn Bay Zoo in late 1984. These were placed with our proven male and both coloured up very well to such an extent that one of our staff thought them both to be males. This was happily proved not to be the case when eggs were discovered in their paddock. Although normally we would allow the male to incubate these eggs (in Rheas as in Emus the males incubate and care for the chicks), because these birds shared a paddock with the Guanacos *Lama guanicoe* we decided to play safe by removing the eggs for artificial incubation, and nine chicks were successfully reared. This number was only eclipsed by the Rhea's diminutive near-relative, the Chilean Tinamou *Nothoprocta perdicaria* whose prolificity resulted in some 36 chicks being hatched, of which the majority was reared to maturity.

Staying with paddock birds, we await successes with cranes and flamingos. For the first time our Demoiselle Cranes *Anthropoides virgo* laid two eggs which, however, proved infertile. The Chilean *Phoenicopterus chilensis* and Caribbean Flamingos *Phoenicopterus ruber ruber* built nests and several pairs were frequently observed together displaying. Copulations were frequently observed but no eggs resulted.

A large outdoor flight holds a mixed group of herons and ibises. Night Herons *Nycticorax nycticorax*, Sacred Ibis *Threskiornis aethiopica*, Straw-necked Ibis *Threskiornis spinicollis* and Little Egret *Egretta garzetta* all nested. A Little Egret was reared, we think for the first time at Chester, the male parent being on loan from Rode Tropical Bird Gardens. Sacred Ibis also successfully reared chicks, but the Night Heron's chicks disappeared shortly after hatching and the Straw-necked Ibis's eggs failed to hatch.

Our Penguins *Spheniscus humboldti* are not good parents. Whilst perhaps six pairs went to nest, only one chick was reared to maturity. Wooden boxes are now being used in the Penguin Enclosure. Whilst not as 'natural' as the nesting burrows the birds have previously used, these

boxes should allow inspection and greater control over breeding activity. One major problem with the old nest burrows was the difficulty in actually recording what was happening in the breeding season; in the future we intend to remove eggs shortly before hatching, or remove recently hatched chicks and hand-rear these.

Perhaps our most significant breeding in 1985 was the hand-rearing of a female Andean Condor *Vultur gryphus*. The parent birds did extremely well early in the season in incubating and hatching a young male Condor. Sadly, this disappeared a week after hatching (probably eaten by one of the parents, the male smashed both eggs the previous year), and we resolved to remove the next egg for artificial incubation. After two months in the incubator we were rewarded with the hatching of a female Condor (the Andean Condors can be sexed on hatching as the males already have the fleshy comb characteristic of their sex). The hard work then began. For a period of three months one of our keepers shared his bedroom with the young Condor so that he was able to give it day and night attention. We had one very worrying period when the Condor rapidly lost weight following an infection possibly contracted as a result of switching from its rat diet (at one stage it was taking the entrails and best leg meat from 24 rats a day) to a rabbit diet. Had it not been for the keeper's attention and enthusiasm we would surely have lost the Condor in this very crucial period. Happily the Condor is now back in the Zoo.

The Spectacled Owls *Pulsatrix perspicillata* laid fertile eggs again this year but unfortunately the clutch was deserted part way through incubation. The chilled eggs were transferred to an incubator and although one very weak chick managed to pip the shell, it died within hours of being helped out of the egg. Snowy Owls *Nyctea scandiaca* reared two chicks for the second year running and a new pair of European Eagle Owls *Bubo bubo* also produced two strong, healthy young.

We were both pleased and disappointed with our Great Indian Hornbills *Buceros bicornis*. Pleased because after only being together a matter of months, this pair went to nest and laid two eggs. Disappointed because after artificially hatching the abandoned eggs following the female breaking out of her nest chamber, we were unsuccessful in hand-rearing the two chicks.

Considering the birds in the Bird House and adjacent Arcade, we were successful in rearing Spree Starlings *Spreo superbus* from two different pairs and also had young from the Crowned Plovers *Vanellus coronatus* occupying the ground space of the same aviaries. The Blacksmith's Plovers *Vanellus armatus*, which we have had since 1979, responded to their move to the central inside aviary of the Bird House by nesting for the

first time. Perhaps the running water stimulated them. Whatever the reason, we hatched a total of seven young, of which three were successfully reared. Palawan Peacock Pheasants *Polyplectron emphanum* and Grey Peacock Pheasants *Polyplectron bicalcaratum* were also bred, removing the first clutches for artificial incubation and leaving the later ones for the parents to rear. Two Kookaburras *Dacelo novaeguineae* were reared by our youngest inexperienced pair but the older pair again failed. Two San Blas Jays *Cissilopha sanblasiana* were fledged, of which one later succumbed to gape worms *Syngamus*. Birds of the crow and starling family are particularly susceptible to this parasite which is ubiquitous in populations of wild British Starlings and Crows.

Red-billed Magpies *Urocissa erythrorhyncha* and Red-headed Laughing Thrushes *Garrulax erythrocephalus* nested but neither had chicks. Coledo Mynahs *Sarcops calvus* and Common Mynahs *Acridotheres tristis* were hatched but neither species managed to rear their young to maturity. The Crested Bronzewing Pigeons *Ocyphaps lophotes*, however, were exceptionally prolific, one pair rearing seven chicks in a succession of clutches, the last of which were hatched on Christmas Day.

The breeding of Pallas's Sandgrouse *Syrphantes paradoxus* has been reported in the *Avicultural Magazine* (1986, No. 3: 121). Several clutches of eggs were laid but the parents failed to show any signs of incubation behaviour. The eggs were, therefore, removed and artificially incubated. Four chicks hatched of which two were successfully reared.

The Finch Flight Aviary holds a mixed collection of birds including Chilean Tinamous and parakeets as well as finches and waxbills. The Mexican House Finches *Carpodacus mexicanus* were embarrassingly successful to the extent that we have had difficulties in finding homes for all the progeny; a total of 19 House Finches were reared. The Splendid Parakeets *Neophema splendida* housed in the same aviary reared eight young in two broods.

Yellow-billed Amazons *Amazona collaria* hatched but failed to rear chicks and we hope to attempt hand-rearing this species in the coming breeding season. The Slender-billed Parakeets *Enicognathus leptorhynchus* were more successful in rearing four of the total of six chicks hatched. Other notable breedings of parrot-like birds included two Red-sided Eclectus *Eclectus roratus polychlorus*, two Derbyan Parakeets *Psittacula derbiana*, eight Maroon-tailed Conures *Pyrrhura melanura*, four Yellow-faced Parrotlets *Forpus xanthops* and 15 Lesser Patagonian Conures *Cyanoliseus patagonus*. The latter included one yellow variant which we were able to exchange for two female Hawk-headed Parrots *Deroptyus accipitrinas*. Our present pair of Hawk-headed Parrots had proved on surgical sexing to be two males. Happily we now have two true pairs - all

four birds have been surgically sexed. The Barraband Parrakeets *Polytelis swainsoni* and Crimson-winged Parrakeets *Aprosmictus erythropterus* hatched chicks but neither species managed to rear these in the cold wet spring.

The rearing of two Lesser Vasa Parrots *Coracopsis nigra* was reported in a previous issue (1985, No. 4:189). Lesser Vasas have become one of our favourite parrots; although sombre in colour, this is more than made up for by their engaging behaviour and most un-parrot-like musical songs. Our other main joy was in the hand-rearing of two Blue-eyed Cockatoos *Cacatua ophthalmica*. The Blue-eyed Cockatoos hatched but failed to rear a single young in 1984, and the first clutch of 1985 disappeared before hatching. We therefore decided to remove their second clutch for artificial incubation. Both eggs hatched and the chicks were hand-reared.

In the free flight of the Tropical House, birds reared included a Fairy Bluebird *Irena puella*, six Red-cowled Cardinals *Paroria dominicana* and a Purple Glossy Starling *Lamprotornis purpureus*. This very natural area gives the false impression of being ideal for breeding birds. Sadly the naturalisation of the area includes natural hazards, both biotic in terms of interference and predation by other bird species, and physical - especially the large number of water areas which appear particularly attractive to fledgling birds. Thus both Long-tailed Glossy Starlings *Lamprotornis caudatus* and Red-backed Mousebirds *Colius castanotus* fledged young but these were not reared to independence. Other species that made nesting attempts in the free-flight included Wagler's Oropendola *Psarocolius wagleri*, Baya Weavers *Ploceus philippinis* and Red-eared Bulbuls *Pycnonotus jocosus*.

The Fire-tufted Barbets *Psilopogon pyrolophus*, which we bred for the first time at Chester in 1984, hatched but failed to rear a single chick early in 1985. This pair laid again in late 1985 from which clutch two chicks successfully fledged in early 1986. Both are now at London Zoo.

Whilst we had our fair share of unsuccessful nesting attempts, the extremely hard work of our bird keepers (and the Animal Breeding Centre Staff who were constantly pestered for live food) resulted in over 200 birds of more than 40 species being successfully reared in 1985. Although our most notable event may have been the first United Kingdom breeding of the Lesser Vasa Parrot, 1985 will perhaps be best remembered for the hand-rearing of our first Andean Condor at Chester Zoo.

BREEDING AND BEHAVIOUR OF SCRUB JAYS

Aphelocoma coerulescens

IN CAPTIVITY

By Dr. T. WEBBER and Dr. J. A. COX

(Florida State Museum, University of Florida, Gainesville, Fla. 32611, USA)

Scrub Jays are noisy, colourful and conspicuous North American corvids. Adults have a blue crown, nape, wings and tail, and a blue band across the chest; the rest of the plumage is greyish brown to greyish white. Young Scrub Jays have brown head feathers until about the end of their first summer. Adults are about 30 cm long and weigh about 75 to 95 g.

Scrub Jays are common in oak woodlands and chaparral of Mexico and the south-western United States, where together there are 17 recognised subspecies (Pitelka, 1951; American Ornithologists' Union, 1957). The Florida Scrub Jay *A.c. coerulescens* lives in scattered patches of oak scrub on the peninsula of Florida, more than 1600 km from the nearest south-western Scrub Jays. Because much of their habitat has been destroyed, Florida Scrub Jays are now gone from much of the range they occupied in historic times (Cox 1984) and are classified as 'Threatened' by the Florida Game and Fresh Water Fish Commission (1981).

For many years, ornithologists considered the Florida Scrub Jay to be a species distinct from the Scrub Jays of the west (e.g. Baird et al, 1858; American Ornithologists' Union, 1931), but the prevailing view now is that all Scrub Jays make up a single species (e.g. Pitelka, 1951; American Ornithologists' Union, 1983).

Scrub Jays give a great variety of calls, which can be harsh or musical, loud or quiet. These calls also differ from place to place. For instance, it appears that the jays in southern California do not share some of their commonest loud calls with the jays of Florida (Fig. 1a-c). Like many other corvids (Goodwin, 1976), Scrub Jays also have a song, called 'warbling song' by Barbour (1977). This song (Fig. 1d) is a series of varied grating and melodious sounds that resembles somewhat the song of a Brown Thrasher *Toxostoma rufum*, or, even more, that of a juvenile Northern Mockingbird *Mimus polyglottos* learning to sing. The Jay's song, though, is uttered so softly that it can seldom be heard more than five metres away. For this reason, we prefer to call it the 'whisper song'. Wild Scrub Jays often sing the whisper song during courtship (Barbour, 1976; pers. obs.), when they are within about 30 cm of one another. They do not use it to advertise their territories.

Scrub Jays are monogamous, and the pairs live on permanent territories.

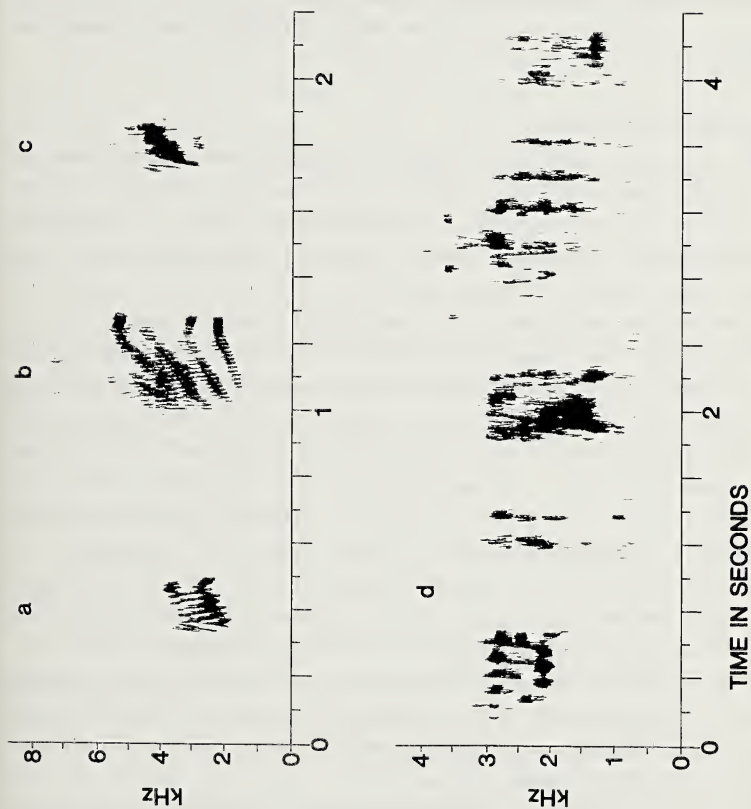


FIGURE 1. (a) One of the commonest long-range calls of Florida Scrub Jays, Recorded in Flagler Co. (b) and (c) Two of the commonest long-range calls of the race *A.c. obscura*. Recorded in Los Angeles Co., California. Apparently, Florida Scrub Jays do not give call types (b) and (c), and *obscura* does not give call type (a). (d) Part of a whisper song sung by one of our captive Florida Scrub Jays.

Young southwestern Scrub Jays leave their natal territories in their first summer, and some breed when they are one year old (Brown, 1974; Atwood, 1980; Carmen, 1982). Young Florida Scrub Jays remain without breeding for up to six years (though usually one or two) on their natal territories, where they help to feed and defend their younger siblings (Woolfenden and Fitzpatrick, 1984).

Scrub Jays are seldom kept in captivity. From 1976 to 1984 we were fortunate to keep more than two dozen Scrub Jays, of four subspecies: *superciliosa*, *oocleptica*, and *obscura* from California, and *coerulescens* from Florida.

Materials and methods

Most of our jays had been caught as fledglings or nestlings, some of which had been rescued from nests that had blown down, or that for some reason had been brought to humane organisations. Others we trapped as adults. Once, we captured a family consisting of mother, father, and nestling, and transferred the group intact, nest and all, to one of our aviaries, where the parents reared the young bird to independence.

Aviaries. Our two aviaries had earthen floors, concrete-block foundations set about 0.3 m into the ground, and wooden frames 2.0 to 2.5 m high. One aviary was L-shaped, 4 m long on a side and covered with $\frac{1}{4}$ in (0.6 cm) hardware cloth. The other was rectangular, 5 x 13 m, and covered with $\frac{1}{2}$ in (1.25 cm) hardware cloth. We sometimes divided the larger aviary into sections with temporary partitions. The two aviaries were about 1 m apart; we connected them with a 0.3 m-diameter tube of hardware cloth, with a removable cover at each end. We made nest platforms of hardware cloth, about 20 cm square, with sides about 5 cm high, and fastened them in corners of the aviaries at heights of 1-2 m.

For nest foundations we provided oak twigs about 30 cm long and about 3 mm in diameter. For the lining we provided fibres from the leaves of scrub cabbage palm *Sabal etonia*. These are the same nest materials that wild Florida Scrub Jays use.

Food. We fed adults on Purina High-Protein Dog Chow, and occasionally peanuts, sunflower seeds and acorns. In 1977 we experimented with a variety of nestling foods. The parents would not feed dead food to the young, even if it was of a type they themselves ate. The adults ate a few live honeybee *Apis mellifera* larvae but would not feed them to their young. We provided fly larvae reared on rotting meat but the parents would not eat them or give them to the young. After 1977 we provided as nestling food only mealworms (*Tenebrio* beetle larvae), which we gave in abundance from the day the young hatched, a few crickets, and occasionally a variety of wild-caught insects.

Behaviour in captivity

Though only two of the jays were tame enough to take food from our hands while we were in the aviary, several others would take food from us if we passed it to them through the mesh from outside. The wildest jays were those caught after they had acquired their blue head feathers.

Like corvids of many kinds in the wild (Goodwin, 1976), our captives stored part of their food, burying it in the dirt floor or wedging it into crevices in the frame of the aviary. They spent much of their time recovering stored food and hiding it again.

The jays often bathed during the warmest part of the day, and one female and her two successive mates seemed to imitate one another in choosing a particular time to bathe. They often went for hours without seeming to pay attention to their water dish, but when one began to bathe the other took immediate notice and often began to bathe as well within a few minutes, sometimes within a few seconds. Once for example, the male began bathing when his mate was absorbed in uncovering food on a part of the aviary floor where she could not see him; when he started splashing she stopped foraging, hopped up to a vantage point where she watched him for a while, and then went directly to another water dish where she bathed. We saw the male bathe first 12 times; eight times the female followed suit within five minutes. The female bathed first eight times; three times the male also bathed within five minutes. We do not have enough information to say whether our other jays seemed to imitate one another this way.

Lacking real territories to defend and not seeing many predators, our captives did not call as often as wild jays do. Like wild jays, they sang the whisper song during courtship, and we also saw subordinates sing briefly after they turned away from a dominant jay that had just supplanted them. Certain inanimate sounds, such as those made by trucks, aeroplanes, and the wind, stimulated the jays to sing, even if they were perched quietly alone. It was hard to tape-record the song because it is so quiet and because the jays sang so unpredictably, but we did have some success by turning on the tape recorder whenever a large trash truck pulled into a driveway across the street. When they sang, our jays sometimes imitated the songs of Red-winged Blackbirds *Agelaius phoeniceus* and Rufous-sided Towhees *Pipilo erythrophthalmus*, as well as the whistling sound that a Mourning Dove's *Zenaida macroura* wings make upon take-off.

Pair formation. Scrub Jays in the wild can form pairs in any season of the year (Woolfenden and Fitzpatrick, 1984). Four times in the spring and once in the fall, we placed together two jays of opposite sex in an aviary separated from the other jays. In one pair, created in the spring, the female had been caught as an adult and never became well-accustomed to capti-

vity. We saw little courtship activity between these two jays, and they never nested. The jays of the other four pairs had been caught as nestlings or fledglings. In these pairs courtship included chases, display flights accompanied by loud calling, and courtship feeding, which often consisted of passing such small objects as rocks rather than pieces of food. In general this behaviour resembled that of the wild Scrub Jays we have watched in California.

We were able to watch the process of pair formation most closely in a pair we established in the autumn. On 28th October 1978 we placed together two two-year-old Florida Scrub Jays. The female, whose mate had died three days before, had bred in 1977 and 1978. The new male, the brother of the female's former mate, had not bred before. When we put the two together, the male flew back and forth across the aviary in miniature renditions of a wild Scrub Jay's display flights, while calling loudly. He also attacked the female so violently that we separated the two by closing a hardware cloth door in a partition dividing the aviary. The next day the male seemed less hostile to the female but for safety's sake we kept the partition closed. As soon as the male was calm enough for the female to get his attention she sang to him while she crouched facing him at a distance of less than 20 cm, and passed food to him through the mesh. On the 30th we opened the door between the two. At first they sat quietly a few metres apart without seeming to pay attention to one another. Thereafter the male sometimes chased the female and, less often, even attacked her, but for the most part his dominance consisted of supplanting her over a foraging site on the ground or at the food box.

After the 29th we saw the female sing to the male only twice, both times without facing him after he approached her. The male approached and sang to her seven times from the 29th to 18th November.

We first saw the male feed the female on 7th November. He fed her often in the following weeks but many times she tried to evade the feedings by hopping or flying away, or if she was cornered, by trying to keep her bill out of the male's reach. When the male succeeded in passing something to her, she often put it down immediately. Once the male passed the same rock to the female 20 times in fewer than 15 minutes.

The female rarely fed the male after he started feeding her regularly. When she did, it was almost always when he was sunbathing, or when he was fluffed and engrossed in preening after a bath. When the male was occupied in this way he seemed not to notice the female until she pushed the object into his bill, and to our eyes he appeared startled.

On 14th November we saw the first of many 'incomplete' feeding attempts by the male. These episodes resembled normal feedings in all ways except that when the male came to within about 20 cm of the female, he stopped and swallowed or dropped the object that he was

carrying, even if the female begged for it with drooped and quivering wings. Complete feedings became rarer and incomplete ones commoner until by 21st November all of the feedings were incomplete. By 24th November the male no longer made even these incomplete attempts at feeding. The two jays then seemed to be an established pair.

Nesting. Aside from the one pair that included a female caught as an adult, all of our paired birds nested when we provided nest material in the spring. They made a total of nine nesting attempts.

The jays first showed interest in nesting by carrying sticks about and dropping them, without taking them to the nest platform. Florida Scrub Jays in the wild pull nest sticks directly from bushes and do not pick them up off the ground (Woolfenden, 1973), but our jays used the sticks we scattered on the floors of their aviaries. We usually saw the first signs of nesting activity in early to mid-March.

Wild Florida Scrub Jays do not re-use nests or nest sites (Woolfenden, 1973). Our jays always used the nest platforms we provided except for once when we left a platform where a pair had nested in it the previous year. This pair refused to use the platform a second time and instead built a nest foundation, without a lining (for we had not yet given them palm-etto fibres), atop a door frame in the aviary. The female laid two eggs, which did not hatch. We then moved the nest platform to a new location and gave the jays plenty of nest material, including lining. Before the male started building on the new platform, he spent some time placing lining, but not sticks, on top of the door frame. It was as though this bird, unable to complete the second phase of nest-building in its first attempt, now had to go through this phase of behaviour before it could begin a second attempt.

The jays we watched most closely during nest-building were two Florida yearlings who nested in 1977. Yearling Florida Scrub Jays do not breed in the wild, apparently because they are unable to get breeding territories of their own (Woolfenden and Fitzpatrick, 1984). The male of this pair built almost all of the nest foundation, and even drove the female away when she tried to put sticks on the platform. After the male finished the foundation the female gradually played a greater part in construction and by the time they added the last of the nest lining the female contributed as much as the male did. During the last stages of nest construction, the jays at the nest seemed to compete for the opportunity to add material. A jay sitting in the nest would try to grab the material brought by its mate, who tried to add the material itself. Sometimes a jay grasped the head or tail feathers of its sitting mate or ran the sitter's back feathers through its bill. This is as close as any of the jays came to allopreening. Other species of co-operatively-breeding jays allopreen commonly (Hardy, 1974).

The two yearlings took 19 days to finish their only nest, which they began in mid-March. Other jays (all older), nesting later in the season, completed nests in as little as four days.

Our jays laid eggs in all nine of their nesting attempts. Females usually laid one egg per day. The mean size of the completed clutches was 4.1. The yearling Florida female laid the smallest clutch, of two, and a seven-year old of the race *oocleptica* laid the largest, of six. Incubation lasted about 18 days, about the same as for wild Florida Scrub Jays (Woolfenden, 1978).

One nesting failed during incubation because the breeding jays were too close to the other birds, who were on the other side of a semi-opaque partition. The jays on both sides spent much of their time trying to attack one another, and the disruption was so great that the female stopped incubating. This pair nested successfully when we moved them to another aviary 3 m from the other jays and out of their view.

The jays produced nestlings in four of their nine nesting attempts, and fledglings in two. We lost three nestlings to snakes - probably Yellow Rat Snakes *Elaphe obsoleta*, which are common around buildings, and which we know ate at least one of our adults. Rodents burrowed into the aviaries and the snakes followed the burrows.

The yearling Florida Scrub Jays' only nestling died on day 10 (we follow Woolfenden [1978] in calling the day of hatching day 1), probably because we had not yet found the right nestling food. We then took down the nest and nest platform. The parents scolded and attacked us if we approached the empty corner where the nest had been, but almost ignored us if we held the nest while standing at the opposite end of the aviary, about 4 m from the former nest site.

We had only one mixed pair, a two-year-old female of the race *superciliosa* and a five-year-old male of the race *coerulescens*. In their second nesting of 1981 they produced five eggs, of which one hatched. To minimise disturbance of the female, we weighed the nestling only three times; each time it weighed about 10 g more than the average for wild Florida Scrub Jays of the same age (Woolfenden, 1978). It fledged on day 20, about two days later than is usual for wild Florida Scrub Jays (Woolfenden, 1978). After it fledged we gradually reduced the amount of live food provided until by about day 50 it was able to eat the same food we provided for the adults.

The hybrid resembled *superciliosa* rather than *coerulescens* in at least two ways: its plumage was deep cobalt blue rather than pale aquamarine, and it had a distinct white stripe (which had been apparent even in its juvenal plumage) over the eye. The only call we heard it give, other than the usual begging sounds, was essentially the same as the one shown in

Fig. 1b.

We found the hybrid and its mother dead of an unknown cause on the same day in late November 1981. Study skins of the two birds are now in the collection of the Florida State Museum (hybrid male: UF 20753; mother: UF 20754). By the age at which the hybrid died, a California Scrub Jay could well be mated and established on a breeding territory (Webber, pers. obs.). Partridge (1966) bred Scrub Jays of the race *californica* in captivity, but to our knowledge this is the first instance of captive breeding by *superciliosa* or *coerulescens*, and the only time that *coerulescens* and one of the western races have hybridised.

ACKNOWLEDGEMENTS

We are indebted to Laura Geison, John W. Hardy, Sylvia Hope, the late Richard E. Warner, and Glen E. Woolfenden for their valuable advice and assistance.

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ARTHUR ALFRED PRESTWICH

By ALAN GIBBARD
(Reigate, Surrey)

With the death of Arthur Prestwich at the age of 85 on 20th January 1987, the Avicultural Society has lost one of its longest serving and most devoted members.

Arthur Alfred Prestwich joined the Avicultural Society in 1928 and, apart from the period 1931 to 1943, remained a member of the Society until his death. He served as a Council Member from 1946-48, as Honorary Secretary and Treasurer from 1949 to 1970, Vice President from 1964-1967, President from 1968-1972, and Honorary Vice President from 1972 to 1987. He was awarded the President's Medal in March 1960.

Throughout his long association with the Avicultural Society, Arthur Prestwich contributed many interesting articles to the *Avicultural Magazine*, which reflected his great knowledge of aviculture and ornithology, and skill as a writer and researcher. As well as a large number of full articles, a great output of smaller contributions and notes came from the pen of 'A.A.P.'.

Although Arthur Prestwich's interest extended to all branches of natural science, birds and especially members of the parrot family were his great passion. At Kents Farm, near Southampton, in North London and later at Galleys Wood, near Edenbridge in Kent, he maintained varied collections of birds, of which parrots formed the major part. The Avicultural Society Medal was awarded to him for the first breedings in Great Britain of the following species: Lineolated Parrakeet *Bolborhynchus lineola lineola* 1953, Guiana Brown-throated Conure *Aratinga pertinax*



chrysophrys 1955, Red-faced Lovebird *Agapornis pullaria* 1956, Green Imperial Pigeon *Ducula aenea* 1957, and the Lemon Dove *Aplopelia larvata* 1958. Many other rare birds were kept and bred, and regularly reported upon in the *Avicultural Magazine*. These reports were usually written by the late Miss Kay Bonner (Mrs. Prestwich).

Between 1950 and 1954 Arthur Prestwich produced his detailed *Records of Parrots Bred in Captivity* which occupied seven parts, and has provided a basic reference for research in the parrot family in captivity ever since. Arthur Prestwich's other important publications included: *Who's Who in Aviculture* (1929), *Records of Parrot-like Birds Bred in the USA* (1949), *Releve des Psittacides eleves en France* (1950), *Records of Birds of Prey Bred in Captivity* (1950, 2nd edition 1955) and *English Names of the Parrots* (1970). Probably his most popular book was *I name this Parrot* (1958, revised edition 1963), a fascinating collection of biographical sketches of people in whose honour species of parrot have been named.

Arthur Prestwich was instrumental in founding The British Aviculturists' Club, which between 1946 and 1973 was largely responsible for the Avicultural Society's social functions. Many important guests attended, and lectured at the B.A.C. dinners, and much of the success of over one hundred meetings was due to Arthur Prestwich's initiative and drive as Secretary-Treasurer.

The Avicultural Society owes a great deal to Arthur Prestwich, especially for his tremendous work as Honorary Secretary and Honorary Treasurer during the 1950s and 1960s. Although he had in recent years suffered ill health, and had been unable to take an active part in the Society's work, he will be fondly remembered as a great aviculturist and officer of the Society.

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The Society has been presented with Arthur Prestwich's first breeding medals by his daughter. These will be displayed at our next meeting and kept in the Society's archives.

Arthur Prestwich was a tremendous help to me when I took over from him as Honorary Secretary and Treasurer and it is impossible to underestimate the amount of work he did to keep the Society going through all those difficult years.

H.J. Horswell

I joined the Avicultural Society in 1949 and have served for many years on its Council. I would like to add my appreciation of all the work that Arthur Prestwich did for the Society and in doing so I should mention Kay Bonner (Mrs. Prestwich) who served as Assistant Honorary Secretary from 1950-1970. Kay predeceased Arthur by some two years. We owe them both a great debt of gratitude for the contribution they made to the life and work of our Society.

R.C.J. Sawyer - Vice President

I had not seen Arthur Prestwich for 25 years although we used to exchange Christmas cards until recently.

My happiest memories of him were during the post war years when he organised the diners' club and we used to have those marvellous dinners at the Rembrandt Hotel which were attended by many avicultural celebrities as guests of honour. Later these were transferred to the Windsor Hotel but rising costs gradually put paid to such activities. I tremble to think what such occasions would cost today!

Arthur at that time maintained a very fine collection of parrots and I had the privilege of visiting this on at least one occasion. I think he was the first to breed the Red-faced Lovebird, if I remember rightly.

He was a good friend with a great sense of humour but he would not put up with any nonsense and his tongue could be sharp at times. It is to my regret that we gradually lost touch after I moved to the West Country and he moved further east into Kent. London seems to act as an invisible barrier between East and West.

D.H.S. Risdon - Vice President

REPAIRING EGG FRACTURES OF THE ABYSSINIAN GROUND HORNBILL *Bucorvus abyssinicus*

By MICHAEL E. MACE

(Lead Keeper, San Diego Wild Animal Park, California, USA)

Aviculturists have always experienced a wide variety of problems with artificial incubation. Apart from problems involving different incubation parameters of exotic birds, occasionally mishaps occur resulting in egg fractures. These accidents can be the result of clumsy birds in the nest or a well-intentioned aviculturist mishandling an egg.

Abyssinian Ground Hornbills are a terrestrial species in the family Bucerotidae. Their habitat ranges from Gambia eastward through Cameroon, Sudan, Ethiopia into northern Kenya.

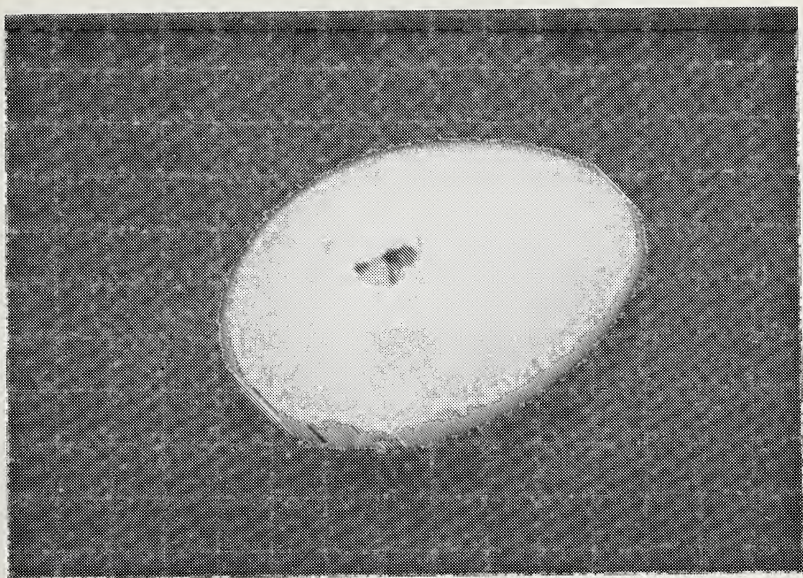
They are large birds measuring 117 cm in length and their plumage and casque bill is black; the facial skin is a deep blue; sexually mature males have a red gular pouch. Females are similar but lack the red pigmentation.

At the San Diego Wild Animal Park we have gained a great deal of experience with this species, hatching 39 chicks since 1972. Our wild-caught pair successfully hatched a chick for which we received the Edward Bean Award (created to recognise notable hatchings or births) presented by the American Association of Zoos, Parks and Aquariums.

Manipulating or removing eggs can be done for a number of reasons: inexperienced parents, as a means of increasing egg production, or predation, as in the case described here.

Hornbill eggs are cream in colour, lacking any camouflage markings. This egg, which measured 7.16 cm by 4.92 cm and weighed 85.70 g, was removed from the nest on the day it was laid and transported to our incubation unit. The egg was weighed daily (see data table) and candled periodically to monitor embryonic development. A Marsh Farms incubator was used at a temperature of 37.2°C dry bulb, and the wet bulb kept at a constant 30.0°C. The egg was turned manually every two hours, 12 hours a day.

On the nineteenth day of the 43-day incubation, the egg was dropped sustaining an indentation which measured 1.78 cm in length, 1.57 cm in width, and .036 cm deep, proximate to the air cell. Extending outward from the area was a series of minute fractures measuring, at the most distal points, 2.98 cm by 4.32 cm. However, the underlaying outer-shell



Michael E. Mace - San Diego Wild Animal Park

Repairing Hornbill egg. Each egg is dated, numbered, and the air cell outlined. This photograph was taken on the day when the chick pipped. The indentation is located proximate to the air cell.

membrane remained intact.

A non-toxic adhesive (we use a product manufactured by Borden Inc. called Elmer's Glue) was carefully applied to the damaged areas avoiding any excess to minimise the amount covering the air cell or shell pores. This was in hope of reducing excessive water loss and potentially lethal viral and/or bacterial infections.

Embryo development progressed normally and on the 41st. day of incubation the chick pipped. The normal interval between pipping and hatching is 48 hours, but the presence of the adhesive precluded any possibility of the chick emerging unassisted. Small pieces of the shell were carefully removed simulating the typical hatching sequence. The chick's emergence revealed a perfectly normal bird, both in appearance and behaviour. These altricial birds are quite easy to hand-rear and this individual proved to be no exception.

Summary

1. When deciding if the damage may be too extensive for treatment and artificial incubation, it is worth considering that there is little invested

ABYSSINIAN GROUND HORNBILL *Bucorus abyssinicus*
WEIGHT LOSS TABLE

DATE	ACTUAL WEIGHT LOSS	NOTES
July 1986	grams	
18	98.8	
19	98.7	
20	98.5	
21	98.4	
22	98.2	
23	98.0	
24	97.9	Vascular growth observed
25	97.7	
26	97.6	
27	97.4	
28	97.2	
29	97.0	
30	96.9	
31	96.9	
August		
1	96.5	
2	96.3	
3	96.2	
4	96.1	
5	96.0	Egg is traumatised
6	95.4	
7	95.0	
8	94.5	
9	94.2	Development of embryo
10	93.8	appears to remain normal
11	93.5	
12	93.2	
13	92.9	
14	92.6	
15	92.4	
16	92.0	
17	91.7	
18	91.4	
19	91.0	
20	90.6	
21	90.3	
22	89.8	
23	89.7	
24	89.4	Chick penetrates the air cell
25	89.0	
26	88.5	Pipping during the night
27	87.5	
28	86.5	Normal healthy bird hatches

in the attempt.

2. Select a non-toxic sealant such as glue, candle wax or paraffin wax.
3. Candle the damaged egg as you apply the sealant to insure all fractures have received proper treatment.
4. Use the minimum amount of sealant to complete the task.
5. Special attention is required at the pipping stage because the sealant may inhibit proper hatching.

ACKNOWLEDGEMENTS

I am greatly indebted to the keeper staff and particularly Mr. T. Levites for the successful incubation and hatching of this chick.

* * *

ROOSTING RIDDLES

By JEFFERY BOSWALL
(BBC Natural History Unit, Bristol)

As the days shorten, and the temperatures drop, so the problem for birds of finding a suitable bed for the night intensifies. Not that the hour at which birds go to roost is determined, as we might first suppose, by the simple alternation of night and day. It isn't. It can also be governed by the pressure of their other business, in particular by when they need to feed. Owls usually hunt by night, and therefore rest by day. The Nightjar relaxes for most of the night *and* most of the day; it is really active only at dusk and again at dawn when the particular kinds of insect it feeds on are themselves on the wing. Estuary-loving ducks and geese, like the Wigeon and Brent Goose that feed on eel-grass normally only uncovered at low tide, have to sleep at high tide, whether that happens to be at night or day.

In the 'land of the midnight sun' - that is to say, north of the arctic circle in high summer - there is no night or day. The birds there - terns, gulls and other seabirds - either take a few hours off just before midnight, or catnap at intervals throughout the 24 hours.

Birds on the whole, however, unlike the majority of mammals, are diurnal and therefore roost at night. What determines where they sleep? Warmth? Shelter from wind and rain? Safety from predators? Well, these three are certainly some of the factors that must influence them.

Small birds in particular have an acute problem of potential heat loss. The tinier a bird is, the greater difficulty it has in keeping warm because its surface area is greater in relation to the volume of its body. So what do they do? Well, in some species a number of them get together and make themselves into one big organism for the night! On the continent of Europe

as many as ten Short-toed Treecreepers have been found huddled together for the night; up to 50 Long-tailed Tits have been observed doing the same. The other kind of treecreeper in Europe, the 'common' one, seems always to sleep alone, though it has shown remarkable adaptability in another way, as I later explain.

Best-known North American 'huddler' is perhaps the Winter Wren. It is among the very smallest of birds and is found not only in America but also in temperate Asia and in Europe. In Britain, in the exceptionally severe winter of early 1963, up to 50 Wrens were counted entering a tit nesting box in the Isle of Wight. Tens and twenties are commonplace. Once they are inside the box or natural cavity they arrange themselves in circles, heads to the centre, often several tiers high.

Even some big birds have to keep warm at night by physical contact when the 'outside' temperatures are really low. The classic example is the Emperor Penguin of Antarctica. The difference in temperature between the surrounding atmosphere and the body of the bird itself sometimes exceeds 140°F. In other words, the bird is maintaining 105°F when the thermometer is reading -34°F. Shoulder-to-shoulder massing is vital to the species' survival, and the formations of birds may persist for 48 hours or more if a blizzard blows up. Warmer birds on the inside allow themselves to be elbowed to the periphery of the scrum, but as soon as they get cold they fight to return so that others can do a turn, back to the wind. Only by evolving sleeping methods like these can the Emperors of Antarctica deal with some of the most appalling weather found anywhere on this planet.

Bearing in mind how many of the world's 9,000 species of birds build nests, it is surprising that so few species build 'roost-nests' for winter protection. A few do, but not many. Certain kinds of woodpecker chisel out not only a spring hole as a nursery for their young, but an autumn one as well, to see themselves through the winter. Unlike the woodpecker, another species that lives in the vertical world of the tree trunk, the Common Treecreeper, can't excavate either nest-hole or roost cranny. Its thin, curved, fragile beak is adapted for extracting tiny insects from crevices in bark. In Britain all native trees are far too tough for it to hack away at; it has always had to find existing crevices for both breeding and sleeping. But then in 1853 the Wellingtonia *Sequoia gigantea* tree was introduced from North America - a tree with an exceptionally soft, fibrous bark. By the turn of the century the first specimens had grown sufficiently for the spongy bole to be about two inches thick. In 1905 a remarkable discovery was made; a neat, rounded hole in the bark of a Wellingtonia in Scotland. It looked as if someone had half-pressed a china hen's egg into the side of the tree. It was thought to be the work of a woodpecker, but

inspection with a lamp at night revealed a Treecreeper resting soundly in the cavity! Without any previous known experience of excavation, the bird had made a do-it-yourself bed. Nowadays Treecreepers all over Britain are hacking out their own night-time cavities in an American tree. The Treecreeper is the only bird known to science that deliberately creates a roost-site using a technique not also employed in any other activity such as nest-building.

The Treecreeper took advantage of an opportunity unwittingly provided by man. There are other examples of this. In London, Salisbury, and doubtless other cities, sparrows and titmice roost inside electric street lamps, benefitting from the artificially provided warmth. These lamps are small, and fine for birds that sleep alone. Those that like company have to find somewhere more accommodating. Pied Wagtails, which always roost in scores or hundreds, have taken to glasshouses for the night in a number of English counties. Not only are conservatories warmer, but they are protected from rain and draughts as well.

Pied Wagtails also roost in the open in the centres of cities, where the temperature is several degrees warmer than in the surrounding country areas. In the London area Pied Wagtails nightly occupy suburban centres like Balham and Barnet, Bromley and Croydon, Ealing and Golders Green. Suburbia is host-dormitory for the night to hundreds of Pied Wagtails that gather in roadside trees in the best lit and busiest thoroughfares. In Dublin's fair city I have counted 1,000 wagtails in one tree in the heart of the capital. The birds must converge on the Irish capital each evening from as far as five or ten miles around. An urban roost of Goldfinches has recently been reported from Kensington in London, and I would not be surprised if the Jackdaw became a commuter from the neighbouring countryside to one of our great cities. Three capital cities of Europe already invaded nightly by these characterful little crows are Sofia in Bulgaria, Stockholm in Sweden, and Alma Ata in Soviet Central Asia. In Moscow I have seen Hooded Crows assembling in trees near Red Square and in Samarkand, Uzbekistan, I estimated several thousand Rooks in the trees of Maxim Gorky Boulevard.

But the best-known urban rooster world-wide is, of course, that prime opportunist, the costermonger of the bird world, the Starling. In America, Europe and Australia, as well as in Britain, Starlings commute nightly to the well-lit, busy thoroughfares, travelling anything up to 30 miles to do so. One such roost I well recall is in the centre of Philadelphia.

There are species, however, that seem to care little for shelter; American Crows perch high in trees all night. I have seen them in Wichita. Perhaps for them the safety of being aloft outweighs the comfort they might find at lower levels.

There is at least one bird species that spends all night on the wing: the Swift. Radar observations have proved that Swifts rise up at dusk on summer evenings to a height of 10,000 ft and remain airborne until near sunrise. Whether they actually 'sleep' in our sense of the word is not known, but they certainly stay aloft all night.

Comparatively little is known of the postures adopted for roosting. Only a few species, if any, put their 'heads under the wing' in the legendary phrase; most sink it down on to the shoulders, as it were. The Bat-parrots of south-east Asia hang upside down from branches by their feet!

Birds resident in an area almost certainly return to the same perches each night, though in some cases each individual may have two or three to choose from depending on the weather. Individual birds in communal roosts return to precisely the twig or whatever each evening, as ringing and the observations on the occasional albino birds have proved. The careful 'allocation' of individual 'beds' in this way is probably important in avoiding an energy-wasting scramble for places each dusk. Roosts of crows and wagtails may number hundreds; those of House Sparrows and Rooks run into thousands; and those of Starlings and Red-winged Blackbirds may be estimated in millions. The biggest Starling roost in Britain is estimated at three million birds.

If you want to see roosting birds for yourself, the easiest course is to take up a commanding position somewhere an hour or so before sunset and scan the view with binoculars. I used to do this from the top of the 160 ft Nelson Pillar in Dublin before it was rudely felled one night by saboteurs of the Irish Republican Army. From the parapet I watched the nightly invasion of the central area by my favourites, the Pied Wagtails, and also by Starlings. From a more rural vantage point, such as, for example, the ridge of the South Downs in Sussex, straggling lines and untidy flocks of Jackdaws and Rooks can be seen etching patterns on the evening sky. Following the flightlines of any large and conspicuous roosters can be a rewarding experience.

The tracing of flight lines to the actual dormitory at the hub is naturally followed up by plotting numbers of arriving birds against time of day (or better, the relative brightness of the sky as measured by a light meter). Such measurements often reveal that on 'shorter' days birds retire later relative to sundown since they have had fewer daylight hours in which to collect food. On overcast evenings the birds go to bed earlier than on clear evenings at the same season.

One would suppose that roosts of English sparrows might be easy to find, but they are not as easy as those of some other species. Sparrows are small birds, less noisy than many; moreover they fly to their sites in small parties or even ones and twos, and often not in a very direct line. Even so,

a British ornithologist found 24 different roosts in an area of $3\frac{1}{2}$ square miles in central London, varying in size from 20 to 2,100 birds.

Why birds congregate in this way is a big puzzle. It can hardly be for warmth since the birds are not perched close enough to one another to raise the local temperature appreciably. It could be that there is safety in numbers. If there are a lot of you together, an approaching enemy - a fox or an owl - is more likely to be spotted sooner, and the alarm raised with a call from the most alert member of the flock. But against this we know that predators are attracted by roosts, and it seems that they must take more birds than they could if the prey species were widely distributed each night over the country. Perhaps the most likely theory is one recently proposed: that the coming-together each night functions to dispense information about food availability. At dawn those that fed well the previous day may be expected to fly out more purposefully towards yesterday's feeding grounds than those that fed less well. It could be that the hungrier ones are more hesitant and allow themselves to get caught up in the flocks that have adopted a firmer course. Certainly this is the most attractive explanation to date of the mighty aggregations of birds that assemble nightly.

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THE FEEDING AND BREEDING OF THREE SOUTHERN AFRICAN SERINS IN CAPTIVITY AND IN THE WILD

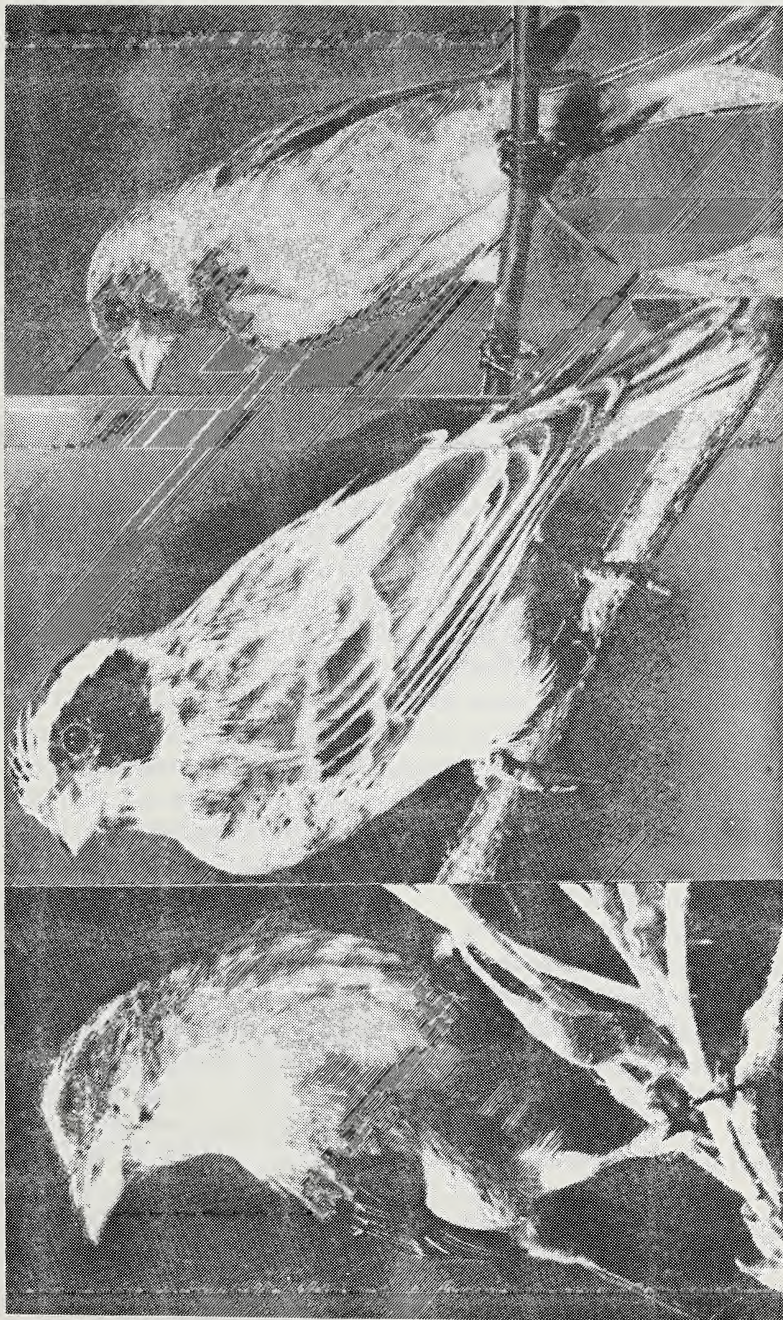
Part 2

By NEVILLE BRICKELL
(Avicultural Research Unit, South Africa)

Part I in this series (Brickell, 1985) related to data on the White-throated Canary *Serinus albogularis*, Bully Canary *S. sulphuratus* and Yellow Canary *S. flaviventris*.

The Cape Canary *S. canicollis* is also known as the Grey-necked Serin or Yellow-crowned Canary. During the breeding season it constructs a substantial cup of vegetable matter in the form of leaves, pine needles, twigs, roots, lichen, moss, string, wool, etc., but especially *Helichrysum*. The lining may consist of the pappi of *composite* plants, fur and fine grass fibres. The nest is situated in the fork or horizontal branch of a bush or tree at 1-18 m above the ground. This serin is usually a solitary nester, but sometimes is in a loose colony of ten or more nests in stands of exotic trees, namely pines and oaks, but recently recorded in Ouhout trees *Leucosidea sericea*. The female constructs the nest which can take up to two weeks to complete. Breeds from August to December in the south-western Cape Province, Natal and Transvaal, South Africa, and from September to February in Zimbabwe. Two to five eggs are laid. They are white to pale greenish white, plain or marked with speckles and blotches and scrolled with black, brown and grey, chiefly at the large end. Egg measurements average (6) 17,2 x 12,8 (15,8-18,9 x 11,6-13,6). Incubation is by the female and lasts 12-14 days; nestling period is 15-19 days. Aviary breedings are few. No explanation is forthcoming as to why they are reluctant to breed in captivity.

The Black-eared Canary *S. mennelli* is more commonly known outside Africa as Mennell's Seedeater. When nesting it builds a deep cup, mainly of lichens and then bound with spider's web. Bark, feathers and other plant matter may be woven into the outer shell. The lining is fine grass, rootlets and moss. It has been recorded using Goat's Beard *Usnea barbata* in Zimbabwe. Nests are usually built in the outer fork of a tree at 1-9 m from the ground. It breeds from November to February in Zimbabwe with two to four, usually three eggs being laid. The eggs are greenish white or pale bluish, spotted and speckled with brown, purple and black, chiefly at the large end. Egg measurements 20,2 x 14,8 (17, 2-22 x 13,2-16). The incubation and nestling periods are not recorded for the wild, but in aviary birds incubation is recorded as 12-14 days (2), nestling period 15-19



Neville Brickell
Cape Canary *S. canicollis*

Black-eared Canary *S. mennelli*

Streaky-headed Canary *Serinus gularis*

days (2).

The Streaky-headed Canary *Serinus gularis* is also known as the Streaky Seedeater and Streaky-headed Seedeater. At the start of the nesting season (October to January in the Transvaal, September to February in Natal, South Africa, and September to March in Zimbabwe), it constructs a loosely formed cup of grass, twigs, dead leaves and bark, lined with vegetable matter and wool. In Zimbabwe, Guinea fowl feathers were recorded in a nest. Nests are placed in vertical or horizontal forks of trees and bushes, between clusters of pine cones and behind peeling tree bark, at 1.5-12 m up from the ground. Two to four eggs are laid. They are white or pale blue, plain or lightly spotted with brown, purple and black, chiefly at the large end. Egg measurements average (54) 18.5 x 13.8 (17-21.2 x 12.6-15). Incubation is by the female, and lasts 12-15 days; the nestling period is 14-17 days.

The Cape Canary feeds on achenes which play a major part in the diet, supplemented with graminoid seed, other small seed, soft plant parts, fruit pulp, fallen grain and insects.

Food genera recorded in the diet of this species: *Inula*, *Athanasia*, *Metalasia*, *Senecio*, *Sonchus*, *Elytropappus*, *Stoebe*, *Eriocephalus* (the daisy and thistle family); *Chenopodium* (the ganna, salt bush and goose-foot family); *Gnidia* (the daisy family). They have also been recorded feeding on the unripe seedheads of:

Blackjack	<i>Bidens pilosa</i>
Khaki Weed	<i>Alternanthera pungens</i>
Guava	<i>Psidium guajava</i>
Loquat	<i>Eriobotrya japonica</i>
the buds and petals of:	
Scarlet Salvia	<i>Salvia splendens</i>
Afrikaans Salie	<i>Salvia chamelaeagnea</i>
Aviary birds will readily accept the seeds of:	
Berg Grass	<i>Setaria appendiculata</i>
Australian Canary Grass	<i>Phalaris tuberosa</i>
Small Canary Grass	<i>P. minor</i>
the fruit of:	
Inkberry (tree)	<i>Cestrum laevigatum</i>
the buds, petals or leaves of:	
Canary Creeper	<i>Senecio tamoides</i>
American Groundsel	<i>S. elegans</i>
Chickweed	<i>Stellaria media</i>
Milk Thistle	<i>Sonchus oleraceus</i>
Smeltersbossie	<i>Flaveria bidentis</i>

The Black-eared Canary has been recorded feeding on the seeds of wild Sunflower *Helianthus annuus*, Mistletoe berries *Viscum capense*, and the petals and buds of *Brachystegia* (flowers with short racemes or spikes or branched to form panicles). In the aviary will take readily to the unripe seedheads of:

Blackjack	<i>Bidens pilosa</i>
Klein Geelbossie	<i>Senecio polyanthemoides</i>
Smeltersbossie	<i>Flaveria bidentis</i>

ripe seeds of:

Pepperweed	<i>Lepidium africanum</i>
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the fruit of:

Bird Plum	<i>Berchemia discolor</i>
African Cranberry	<i>Vaccinium exul</i>
Wild Plum	<i>Harpephyllum caffrum</i>
African Mulberry	<i>Morus mesozygia</i>
Nana-berry	<i>Rhus dentata</i>

and the buds, petals or leaves of:

Chickweed	<i>Stellaria media</i>
Milk Thistle	<i>Sonchus oleraceus</i>
Canary Creeper	<i>Senecio tamoides</i>

The Streaky-headed Canary feeds on seeds, soft plant parts, fruit pulp, nectar and insects. Food genera recorded in the diet of this species:

Maytenus (the spindle family); *Aspalathus* (the pod-bearing family); *Aloe* (the lily family); *Nymania* (the mahogany family); *Lampranthus* (the vygie family); *Salsola*, *Chenopodium* (the ganna, salt bush and goosefoot family); *Olea* (the olive family). It has also been recorded feeding on the seeds of:

Sorghum	<i>Sorghum bicolor</i>
Silver Protea	<i>Protea roupelliae</i>
White Stinkwood	<i>Celtis africana</i>
Bulrush Millet	<i>Pennisetum glaucum</i>
Sweet Thorn	<i>Acacia karoo</i>
Casuarina	<i>Casuarina equisetifolia</i>
Thatch Grass	<i>Hyparrhenia hirta</i>
Tobacco	<i>Nicotiana tabacum</i>
Wild Sunflower	<i>Helianthus annuus</i>

It probes the bases of flowers to extract the nectar, namely:

Flat-flowered Aloe	<i>Aloe marlothii</i>
Candelabra Aloe	<i>A. candelabrum</i>
Krantz Aloe	<i>A. arborescens</i>

Bitter Aloe	<i>A. ferox</i>
Dwarf Hedgehog Aloe	<i>A. humilis</i>
Partridge Aloe	<i>A. variegata</i>
the buds, petals or leaves of:	
Scarlet Salvia	<i>Salvia africana</i>
Cape Honeysuckle	<i>Tecomaria capensis</i>
Cockscomb	<i>Amaranthus hybridus</i>
African Marigold	<i>Tagetes erecta</i>
French Marigold	<i>T. patula</i>
Peach	<i>Prunus persica</i>
Apricot	<i>P. armeniaca</i>
and the fruits and seeds of:	
Paw Paw	<i>Carica papaya</i>
Taaibos	<i>Rhus pyroides</i>
African Mulberry	<i>Morus mesozygia</i>
Kraal Honey-thorn	<i>Lycium afrum</i>
Bird's Brandy	<i>Latana rugosa</i>
Wild Fig	<i>Ficus sp.</i>
Aviary birds will readily accept the seeds of:	
Khaki Weed	<i>Alternanthera pungens</i>
Thatch Grass	<i>Hyparrhenia hirta</i>
Teff Grass	<i>Eragrostis tef</i>
Bird Grass	<i>Poa trivialis</i>
Golden Setaria	<i>Setaria sphacelata</i>
the fruits and seeds of:	
Sand Jackal-berry	<i>Diospyros batocana</i>
Bird Plum	<i>Berchemia discolor</i>
Strawberry-Guava	<i>Psidium cattleianum</i>
Common Forest Grape	<i>Rhoicissus rhomboidea</i>
Nana Berry	<i>Rhus dentata</i>
Climbing Raisin	<i>Grewia caffra</i>
White-berry Bush	<i>Securinega virosa</i>

All three species feed live food in small quantities to nestlings.

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ADDENDA to. Part I of this series in *Avicultural Magazine*, Vol. 91, No. 4, pp 217-221.

Quantitative summary of diets, expressed as percentages of total feeding occasions for food genera (only south-western Cape Province records used). Figures in parentheses are total feeding occasions for each. Yellow Canary (89), White-throated Canary (52) and Bully Canary (63) (Milewski, 1978).

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BREEDING AND HAND-REARING THE BLACK PALM COCKATOO *PROBOSCIGER ATERRIMUS*

By Mr and Mrs. R. MANN
(Peterborough)

Bates and Busenbark (1969) refer to this cockatoo as fearsome looking rather than beautiful. At first sight, most people would agree with them. However, they are not the type of bird to be discounted out of hand. To us they are magnificent. Proud, regal, on the whole shy birds, stamping their feet when alarmed or annoyed, awkward and ungainly but somehow commanding respect.

According to Joseph M. Forshaw's excellent *Parrots of the World*, the Palm Cockatoo inhabits forest and savannah woodland in New Guinea and surrounding islands extending to Cape York Peninsula in Northern Australia. They feed on seeds, nuts, fruits, berries and leaf buds. On Cape York Peninsula they have been seen eating seeds of the kanari and black bean tree and the fruits of the nonda and palm tree.

The plumage is greyish black, forehead and lores black. The naked cheek patches pass from bright red to almost white when alarmed, excited or under stress. The female's upper mandible is smaller than the male's. Forshaw says that in immatures feathers of under wing-coverts and underparts are edged with pale yellow. We have never found this to be the case in young. It is more likely to be diet deficiency, lack of melanin, or more probably over-preening by parents resulting in yellow re-growth feathers. Have any other breeders seen this yellow edging?

This particular unsexed pair of Palm Cockatoos belonged to fellow-member George A Smith and were given into our keeping approximately 13 years ago. We were somewhat inexperienced in bird husbandry at that time and consequently the first aviary introduced to them was quite unsuitable and as far as this pair were concerned, just a place to climb about, feed and generally just pass the time of day. No interest at all was shown in the conventional, albeit substantial nest-box offered to them.

On one of our 'move-a-rounds' we decided to rehouse this pair in a much smaller aviary 14 x 7 x 5 ft which, having black hanging slate tiles to the back wall, was quite dark and, in fact, it was extremely difficult to distinguish the pair of Palm Cockatoos. We hoped this environment would prove more suitable for breeding. We had decided to incorporate a wooden sloping nest-box into the back wall with an inspection door through into the back alleyway. The basic principle of our nest-boxes was utilised, i.e. steps inside made out of blocks of wood thus enabling the birds to whittle away and make up their own nesting material. However, we soon found out that when Palm Cockatoos decide to build a nest,

they need a little more than just a few wooden steps in a nest-box!

Unknown to us, they had chewed all the wood inside the box and, still needing nesting material, had gone out through the false ceiling in their aviary and brought back wood from the roof of the Sun Conures' aviary some 8-10 ft away.

In 1982, much to our delight (and dismay), we found a broken egg on the floor of the aviary - we had a hen at least. The nest-box was proving quite unsatisfactory as the hen had chewed so much wood she could be seen sitting on the top of her nesting material. We had to think of something else. Concrete blocks seemed to be food for thought - definitely parrot-proof and hopefully able to withstand the enormous destructive strength of the cockatoos' beaks. Still adopting the sloping principle, the concrete nest-box was built out of a total of 32 blocks. No wood was fixed inside. For nesting material we pushed large bushy branches to the back of the aviary, giving a dense forest effect and then waited. Would the cockatoos accept something so alien? Within two days chewed up bits of branches had been taken into the box and within a week most of the nesting material had disappeared. The birds still were not satisfied. Everything moveable and chewable went in, even the large plastic washing-up bowl used as their water container. Both birds built the enormous nest which must have had a depth of at least 2½ ft of chewed and splintered wood.

On 27th April 1984 the hen laid. The single egg measured 49.25 x 34.30 mm and weighed 30.92 g when taken out at eight days. George Smith suggested fostering it under a pair of his Sulphur-crested Cockatoos, housed with friends in Peterborough. This pair had fortunately laid two eggs and were very steady and reliable. The total incubation time was 34 days, the chick taking four days to hatch from pipping. Quite a long time by parrot standards and quite testing on the nerves of the keeper! However, the foster birds refused to feed the chick, possibly sensing by call that it was not their own. After some 18 hours and the chick still not fed, it was decided to take it for hand-rearing. It was the ugliest chick we had ever seen and, as the saying goes, 'only its mother could love it.'

Having already set the brooder at 98° in readiness, we fed the chick initially on 1 ml Milupa 7-Cereal food made up to a very runny consistency every two hours. The last feed was given at 11.30 p.m. and the first at 5.30 a.m. A little yoghurt was added on the second day. The chick differed from other cockatoos we had reared in that it hatched with no down. Ears were sealed and the toes fused together (these did not unfurl until day 9). Its skin was a very bright, pinky red, quite unlike any other chick we had seen. The food was increased slightly to 2 ml every 3-3½ hours after five days, and a few grains of ground sunflower seed were

added. It was our intention at the outset to hold the chick back and restrain from over-feeding, a common cause of death in young chicks. Hence the extended day and night feeds.

On day 9 Milupa Mixed Vegetable baby food was added to the cereal and ground sunflower. The mix was still fed fairly runny. More importantly, the crop was empty the majority of the time, always a worrying aspect of hand-rearing. What to do when it does not empty? In this instance the chick was left perhaps another hour and if the crop was still not quite empty, it was fed a smaller amount to top it up. This way the chick sometimes went as long as 4½ hours between feeds. A sliver of skin inside the mouth similar to a gum shield had disappeared on day 8. This hard, gristle-type skin was nowhere to be seen in the nesting material and was assumed to have been swallowed by the chick and although we were concerned at the time, there were no adverse effects.

'Cede' was added on day 15. The rearing diet was, therefore, made up of equal quantities of Milupa Mixed Vegetable, ground sunflower seeds and 'Cede' (no fruit); the 7-Cereal was dropped. During all this time the young chick had a coarse, very harsh-sounding scream which he exercised to abundance before and after feeds. The eyes were slit open by day 17 and the sides of the bottom mandible were taking on a bulbous shape. The temperature was still kept high - 95° - much higher than we would normally expect to keep a chick in of that age. By day 20 the black crest markings were just visible under the crown with a nice sheen to the head and a dark area forming on the bridge of the beak. The head was much larger in proportion to the body and the chick was, in fact, quite an ugly looking specimen.

Food intake was progressing gradually, reaching 7-8 ml each five-hourly feed at 24 days. At day 26 we changed to spoon feeding. We had decided to keep him on the syringe quite late in order that we could monitor his intake. Pin feathers were now breaking through the back in parallel lines down the spine, although no pin feathers or down was visible on the main body area. The red cheek patches were just beginning to appear at day 30. When put into a plastic fish tank (an ideal rearing container) with an Amazon parrot chick for company, at day 40, he measured 12 in high. The feathers were breaking from the quills at 46 days. During all this time the chick, now named 'Duke', loved attention although he would scream if any other person came into the rearing room, particularly men.

He was put on three meals a day at nine weeks and continued to make steady growth and progress until independent at six months, the longest it had taken to wean a hand-reared chick.

The weight chart of the chick compares favourably with that of an adult Black Palm Cockatoo.

DAY	GRAMS	DAY	GRAMS
1 (1.6.84)	18.47	24	125.50
3	19.51	25	139.00
4	21.75	29	206.00
10	32.82	35	308.00
12	40.99	41	426.00
14	54.00	46	482.00
15	57.50	55	532.00
17	65.70	67	660.00
18	70.00	85	866.00
19	75.80	103	927.00
20	81.80	152	933.00
22	103.00	Independent 30.11.84	

REFERENCES

- FORSHAW, Joseph N. (1973). *Parrots of the World*. Lansdowne Press, Sydney.
 BATES & BUSENBARK (1959). *Parrots and Related Birds*. T.F.H. Publications, Inc., New Jersey.

As described above, the Black Palm Cockatoo *Probosciger aterrimus* has been bred by Mr. and Mrs. R. Mann and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or of any other reason that would disqualify this claim, is asked to write to the Hon. Secretary.

* * *

THE FIVE MOST TYPICAL WAXBILLS

By DEREK GOODWIN
(Petts Wood, Kent)

I apologise to readers for the rather odd title of this article but I could not think of a better one that was reasonably short. 'The typical waxbills' would hardly have done since I, and others, have used it elsewhere to include all the species now put in the genus *Estrilda*, and here I propose to deal only with five closely related species, the Common Waxbill *Estrilda astrild*, the Black-lored Waxbill *E. nigriloris*, the Rosy-rumped Waxbill *E. rhodopyga*, the Black-rumped Waxbill *E. troglodytes* and the Arabian Waxbill *E. rufibarba*. If, as is commonly and I think rightly thought, the name waxbill was originally applied to either the Common or the Black-rumped Waxbill because of their red, sealing wax-like bills, then it seems justifiable to use the term 'most typical' for this little group of similar and related species.

All five are generally very similar in appearance being mainly brown or brownish grey in general colour with a pattern of fine cross-barring on most of the plumage, a conspicuous red or (one only) black eye-stripe and red or partly red bills. Most of them are allopatric or nearly so but the Common and Rosy-rumped Waxbills show a large area of overlap on the map, although the evidence suggests that in such areas of apparent overlap they are confined to different habitats or altitude. All build rather large, compact nests with an entrance tube and usually with a 'cock nest' on top of or alongside it. It seems very likely that all are parasitised by the Pin-tailed Whydah *Vidua macroura*, as the Common Waxbill is known to be.

The Common Waxbill *Estrilda astrild*

Description and other names: This species is, or was, commonly known as the St. Helena Waxbill by bird dealers, although it was introduced to that island. Other names that are, or have been, sometimes used for it are Brown Waxbill, Barred Waxbill and Pheasant Finch.

It is about a third smaller than a House Sparrow of the nominate race *Passer d. domesticus* but looks only about half the size, with a trim shape and longish tail. It shows much minor variation in size and colour in different parts of its range (Goodwin, 1982) and for reasons of space I must attempt an overall composite description here. Its upperparts vary (racially and to some slighter extent individually) from dark to light brown, which may be either reddish or greyish or

neither in general tone but is always marked with fine but distinct cross-barring on all feathers except those of forehead, primaries and to some extent the tail quills and feathers on the crown of the head. In some forms the brown parts, especially on the rump, may be tinged with red. The cheeks, throat and sometimes also the upper breast are whitish, pale grey or pale pink. The rest of the under parts are pale greyish, pale fawn or pinkish, each feather cross-barred with brownish or greyish, except for a scarlet, crimson, rose-red or deep pink belly patch (which in some races 'spreads' on to flanks or breast) and a blackish or dark brown ventral area and under tail coverts. The bill is bright red, the eyes brown and the legs dark brown or blackish.

Hens are, as compared with males from the same locality and in similar state of plumage, usually less brightly red on the belly, less suffused with pink on the underparts and with less intensely dark ventral area and under tail coverts. The juvenile is duller, with only faint cross-barring on the feathers, the red and blackish areas on the underparts only slightly indicated and the red eye stripe duller and edged below with blackish. Its bill is at first blackish but soon starts to change colour.

Distribution and habitat: The Common Waxbill has a wide range in tropical and southern Africa, south of the range of the Black-rumped Waxbill. It has been successfully introduced into St. Helena, Mauritius, Reunion, the Seychelles, Amirantes, New Caledonia, Tahiti, Brazil, Portugal and possibly elsewhere. It inhabits fairly open country with long grass, marshes, cultivated areas, especially abandoned or partially abandoned cultivation at the stages when wild grasses and weeds are taking over, and grassy clearings in forest or woodland.

This species is the only waxbill I have seen wild in its native habitat. As a young soldier spending a fantastic fortnight in Durban in May 1941, en route to the Middle East, I was taken out by an hospitable South African couple to see some famous beauty spot. Walking on a wild, grassy hillside, with wonderful views over undulating hills and valleys I suddenly heard a bird call that seemed familiar and looking around saw a pair of Common Waxbills ('St. Helena Waxbills') nearby, perched on some long, dead stems, looking anxiously at us and agitatedly swinging their tails from side to side. For a moment I thought that they must have escaped from some birdshop or aviary then realised that, of course, I was in Africa and they were wild birds. Much later, in October 1972, I saw a flock of these birds on some waste ground more or less in the centre of Rio de Janeiro, in Brazil.

Feeding habits: Like its congeners, this species can cling easily

among growing vegetation and hold grass panicles, stems and other such objects under foot when feeding or collecting nest material. Seeds, taken both from growing plants and from the ground are the staple diet. In Africa grasses of the genera *Setaria*, *Paspalum* and *Digitaria* are often, probably usually, important food plants. In Brazil seeds of several grasses, a sedge and the Amaranth are commonly taken. Swarming termites are eaten (Immelmann et al) and it is very likely that other small insects are also eaten at times.

I have no experience of this bird in captivity. At times it seems incredibly hardy or at least resistant as I have known birds live a long time incarcerated in small cages in pet shops and apparently fed on nothing but dry seed. Immelmann et al, in their comprehensive work on estrildids in captivity, recommend that only small kinds of millet should be offered (I doubt if the larger millets will do any harm if the birds have ample supplies of the small panicum millet as well) and that greenfood, 'half ripe' seeds, soaked seeds and insect food should also be offered and the birds not kept below a temperature of 15°C.

Most of the few records of captive breeding that I have seen involved pairs in large aviaries where it was uncertain precisely what foods were taken by the waxbills but our late member, Sir Godfrey Davis, successfully bred Common Waxbills in a cage in India. His birds at first fed the young mainly on seeds of grasses given to them and hard-boiled egg yolk but after the fifth day a little egg was taken and small maggots (not from the Blow Fly) and grass seeds were fed to the young.

Behaviour, voice and nesting: The calls and song (or what passes for song) have been described in detail elsewhere by our member Colin Harrison (1962). They are generally rather short and harsh calls and throaty bubblings but higher pitched and less nasal than the corresponding notes of the Black-rumped and Rosy-rumped Waxbills.

The greeting display is similar to those of other typical waxbills and of the finches *Lagonosticta* spp., a lowering of the body, turning the head towards and bowing towards the other bird while giving contact calls. There follows a slower return to the normal body position. As in other estrildids, the tail is angled towards the other bird in all displays that are sexually motivated but in this and other *Estrilda* species, which wag or switch their tails from side to side in almost any excitement, the angled tail posture is sometimes only indicated by the greater amplitude of the movement on the side towards the bird displayed to.

In courtship display the bird holds a long grass stem, a feather or other nesting material by one end in the bill and with bill pointing

upwards, flank and belly feathers fluffed out, tail angled towards the other bird and often leaning the body a little away from it so as to make the red belly patch more visible, the displaying bird jerks itself stiffly up and down but without letting go of its perch. The cock starts to sing after a few upward movements but the hen, who if interested responds with the same display, is said not to. This display does not usually lead directly to copulation which is seldom seen and therefore thought, probably correctly, to take place in the nest.

The rather large, round to pear-shaped nest is built of grass stems, lined with finer grasses and sometimes a few feathers. It has a downward sloping entrance tube from 4-15 in long and about 1 in in diameter inside. Usually a cock nest is placed on top of the real nest. This cock nest seems usually, in the wild, not to get beyond the cup-shaped or half-domed stage. When alarmed or suspicious, the birds fuss noisily around the cock nest and carry conspicuous objects to it (Van Someren). The nest may be sited on the ground in grass or other vegetation or up to about 12 ft above ground in some bush, tree, or creeper. Ground nests often have a cleared space in front of the entrance hole. I suspect this functions to aid the birds to see and remove in time potentially dangerous insects, particularly the 'scouts' of foraging parties of ants.

The Black-lored Waxbill *E. nigriloris*

Description: It is not certain whether this is a 'good' species or a very marked race of the Common Waxbill but for reasons discussed elsewhere (Goodwin) it seems best treated as a full species provisionally. Apart from having most of its plumage more strongly tinged with pink and a less definite red belly patch than most forms of *E. astrild*, it differs from the Common Waxbill only in having a black, not red, eyestripe.

Distribution and habitat: Found in Zaire (formerly the Congo), on the banks of the Lualaba River, near latitude 8° 26' S., and the shores of Lake Upemba, in level, grassy areas with trees and bushes.

Other information

Virtually nil (unless I have missed some recent publications on it). Collected specimens had eaten grass seed. This species seems unlikely to be available to aviculturists.

The Black-rumped Waxbill *Estrilda troglodytes*

Description and other names: This species is often called Red-eared Waxbill in avicultural circles. Common Waxbill and Grey Waxbill are also frequently used names in aviculture, leading to confusion

with *Estrilda astrild* and *E. perreini*. It is, or at least was, one of the most commonly imported species. Usually it was sold much more cheaply than the Common ('St. Helena') Waxbill although, in my opinion, it is a more beautiful bird and indeed, in spite of its generally 'quiet' coloration, one of the loveliest of all estrildids, the Gouldian Finch not excepted.

It is a little smaller in size than the Common Waxbill and the general colour is paler, light brownish grey above with delicate cross barring of a darker shade of the same colour. The underparts are also paler. In some birds the whole plumage is beautifully tinged with delicate pink, in others this pink tinge is less or even absent. There is a rosy-red patch on the belly that often spreads somewhat upwards on to the lower breast and flanks. There is a red eye-stripe as in *astrild*. The rump, upper tail coverts and tail are black except for the outer webs of the second from outermost pair, which are whitish. The bill is bright red, the legs dark brownish or blackish.

Females tend to have less extensive red on the underparts and less often to have the whole plumage strongly tinged with pink but this difference is only true of the majority and some hens are as pink as any cocks. Differences between adult and juvenile are similar to those described for the Common Waxbill.

Distribution and habitat: The semi-arid zone of Africa north of the range of the Common Waxbill (or most of it) from Senegal and Gambia east to north-eastern Zaire, north-western Uganda, the Sudan north to Darfur and Sennar, Eritrea and north-western Abyssinia. It is found in grassy savannas, thorn scrub (with some grass), marshes and sometimes cultivated areas but seldom very close to human habitations.

Feeding habits: Little studied in the wild but known to take grass seeds and 'midges' and to feed both in growing grasses and on the ground. In the 1960s I kept four of this species, two hens, paired together and originally mistakenly thought to be a cock and hen, were with me for about eight years. I found that they took mostly white millet and panicum millet but also at times a little small canary seed. They were fond of both green and ripe seeds of the Annual Meadow Grass *Poa annua* and would also eat the seeds of some other grasses, Chickweed *Stellaria media* and Knotgrass *Polygonum aviculare*. Tiny unidentified (by me) flying insects were caught on the wing and green aphids (but not black or grey aphids), and the pupae and larvae of the small ants of the genus *Lasius* were usually taken eagerly. Like Avadavats *Amandava amandava* and Goldbreasts *A. subflava* they also

often ate the growing tips of grass shoots.

I found them (to my surprise) much readier to sample artificial soft foods such as milk sop, sponge cake (homemade) and cooked egg than any of my other waxbills except the Rosy-rumped.

Behaviour, voice and nesting: Most of the calls of this bird are loud and rather harsh for so small and dainty a creature. A repressed *cheu-cheu* or *chit-chit* appears to serve as a short distance contact call and also to indicate the intention to fly. A louder, upwardly inflected *cheer* or *cheee-ay* indicates alarm and perhaps other conditions of excitement. A more *buzzing* version is sometimes given in threat. A soft murmuring twitter is given as a nest call and sometimes when changing over during incubation. The song is very variable. A loud, explosive double note *tche-tcheer!* or *chee-eeer!* with the second note in each case strongly upwardly inflected; and an equally explosive *tchu-weee* with the second note descending were the commonest and most divergent versions I heard. Females are said not to sing but one of mine sometimes did so, her song I transcribed as *Pwich! Cheee!* with the second note upwardly inflected with a second version which consisted just of the explosive *Pwich!* note twice repeated. Song is given by the male (and in my experience also sometimes by the female) when performing the courtship display, but sometimes when the bird is alone.

The courtship display is very similar to that of the Common Waxbill (q.v.). The male sings during his display, the female tends to display less often and usually (but by no means always) without singing. Quite often birds will display when alone and in such cases, as also when the bird displayed to is directly in front of the displayer, the flanks are not fluffed out more on one side than the other and the tail is held straight out behind.

In what Kunkel termed 'the fluffed singing display', a cock, with-



(1) Diagrammatic sketches of Black-rumped Waxbill (top) and Rosy-rumped Waxbill (bottom). Solid shading on body or tail indicates black or blackish brown. Shaded area on sides of head indicates red. Unshaded areas of bill are red, shaded area of the Rosy-rumped Waxbill's bill are dark brownish.

(2) Black-rumped Waxbill in courtship display. Sketched from a photograph by Peter Kunkel.



(3) Impression of Black-rumped Waxbill performing the pendulum-like side to side tail movements. Note that tail is spread more on the side to which it is swung.

out nesting material in the bill but otherwise in the posture of the courtship display, will hop after and/or around a hen, singing repeatedly. This behaviour is shown at least in captivity, towards hens that the cock in question knows but is not paired to. If the hen does not flee, the male attempts to copulate forcibly with her, usually (always in the instances that I have watched) without success.

Mutual preening between paired or friendly individuals is common in this species as in its relatives.

All descriptions in books (that I have read) of wild nests of this species seem to be derived, with or without acknowledgements, from Shuel who found three nests in northern Nigeria. They were pear-shapes, made of

dry grass heads and each had a cock nest in the form of a 'cup-like extension' on one side. Each nest was on the ground at the foot of a clump of grass or small bush.

In captivity this species often chooses to nest well above floor or ground level in a bush or in a basket or other receptacle but this is probably an artifact of captivity caused by too much disturbance or no suitable site at ground level. The nest is ball- to pear-shaped and usually has an entrance tube but this may sometimes be only the merest suggestion of a tube at the small, low entrance hole. In captivity the birds will use various grasses and/or coconut fibre to construct the nest and line it with feathers or other soft materials. I dissected a number of nests built by my captive birds and always found in them numbers of feathers (mostly white or pale in colour but sometimes a few dark ones) bits of tissue paper, cloth or plant wool and a few pieces of earth. Pieces of eggshell, dry excreta, bits of shiny looking wet earth and almost any materials that are either white *or* dark *and* shining are placed on top of the nest and in and around the entrance of the cock nest. Tiny dead and rotting nestlings or dead and putrescent large insects are taken with extreme eagerness and placed in or near the entrance of the cock nest. I have also often seen the birds take wet earth in their bills and make movements as if they were rubbing the grass or other material at the nest entrance with it.

I observed repeatedly with my birds that when in apparent conflict between the urge to incubate and fear or suspicion, they would fuss around and carry objects to the cock nest. This was most marked with a pair nesting in a basket on the wall of the bird room. Here they were, of course, unable to build a cock nest on top so they used a basket about 2 ft away, and containing an active nest of a pair of Blue-headed Cordonbleus as a substitute and would fly to it and fuss around it when perturbed.

There has been much argument and speculation about the function (if any) of the cock nests of this and other birds. I have gone into this in some detail elsewhere (Goodwin). Suffice here to say that I think the function of it is to 'draw a red herring across the trail' and mislead some predator or predators who might otherwise discover the real nest beneath. Whether this is the case, and what predator or predators are involved, only studies of wild birds 'in the field' are likely to reveal.

When nest-building, this bird, like the Rosy-rumped Waxbill (and, I expect, the other species being dealt with here) will reach up, pull down a grass stem, hold it underfoot, neatly bite through the stem and sever it. This behaviour enables these species to obtain live stems, or dead stems firmly attached to a clump, at which a cordon-blue *Uraeginthus* sp. or firefinch *Lagonosticta* sp. can only tug and jerk in vain.

The Arabian Waxbill *Estrilda rufibarba*

Description: This species is sometimes considered a race of *E. troglodytes* but I think it best given specific rank for reasons discussed elsewhere (Goodwin). It differs from the Black-rumped Waxbill in being very slightly larger and with rather larger bill and longer tail. The ground colour of both upper and under parts is greyish brown with much stronger, darker barring and without any tinge of pink. The central tail feathers and the rump are a less intense black, often more blackish brown, and a minority of birds have some admixture of dark red on the rump. There is no red on the belly. The eyestripe is a darker red and in some hens intermixed with black. The bill is blackish with a red mark on each side of the upper mandible and at the sides and base of the lower mandible.

Distribution and Habitat: South-western Arabia. Inhabits valleys and ravines with bushes or reedbeds.

Feeding and other behaviour: Virtually nothing appears to be recorded beyond that it eats the seeds of grasses and rushes. Probably in captivity it would behave essentially as the Black-rumped Waxbill. I have, however, never heard of it being imported and as it is less beautiful than the Black-rumped, Rosy-rumped and Common Waxbills, it would have little but its rarity to commend it to aviculturists. I mean nothing to make it *more* desirable than these other species.

Rosy-rumped Waxbill *Estrilda rhodopyga*

Description and other names: Also known as the Crimson-rumped Waxbill, Rosy-winged Waxbill and Sundevall's Waxbill, this species used to cost considerably more than the Black-rumped Waxbill (and perhaps still does) though it is not, in my opinion, quite so beautiful in appearance and has a harsher voice.

As compared with the Arabian Waxbill, described above and which it much resembles, this species is rather more buffy, less grey in tone in the brown parts of its plumage and the cross-barring is less intense though more so than in the Black-rumped Waxbill. The under tail coverts have dark barring or mottling and are more or less fringed with red. The outer webs of the greater coverts and the inner secondaries are fringed with deep rose-pink or carmine, forming two subdued red patches on the folded wing. The upper tail coverts and outer edges of the tail feathers are also deep rose-pink to crimson or carmine.

Distribution and habitat: Eastern tropical Africa from the southern Sudan, Eritrea and eastern Abyssinia south to northern Tanzania and northern Malawi. It inhabits dry grassland with bushes, acacia savannah, riverside scrub and sometimes cultivated areas. The presence of surface water seems to be essential.

Feeding habits: I have seen no detailed account of its food in the wild. It is known to take grass seeds both from growing plants and from the ground and these are probably its chief food. Four captive birds, three cocks and one hen, fed mainly on pannicum millet. They eagerly took greed aphids, green and ripe seeds of Annual Meadow Grss, Knotgrass and the tips of growing grass shoots. They ate ant pupae but with less avidity than most waxbills do and never in large amounts. Feeding methods and methods of biting through grass stems are as I have described for the Black-rumped Waxbill.

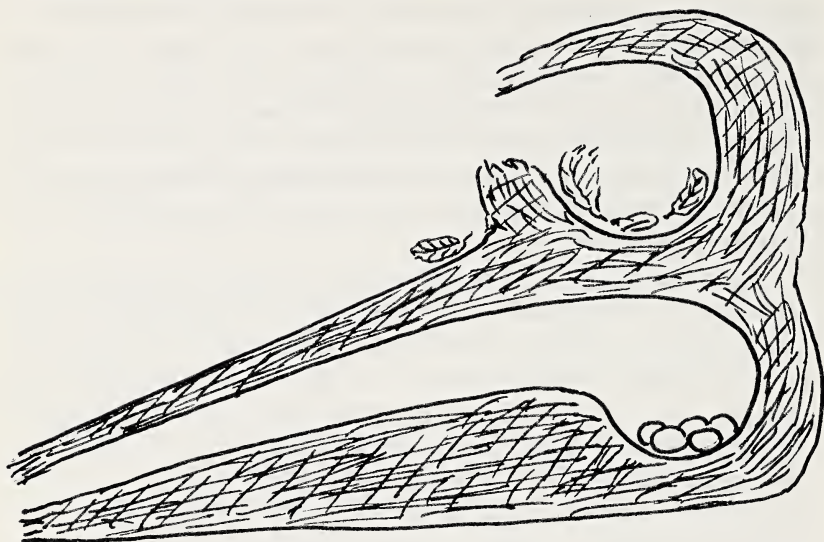
Behaviour, voice and nesting: The calls and song of this species are very like those of the Black-rumped Waxbill but louder and harsher in tone. I am therefore not describing them further here owing to shortage of space.

The displays of this species are also like those of the Black-rumped Waxbill. In captivity my Rosy-rumped and Black-rumped Waxbills reacted to each other as if to conspecifics. However, as only a few individuals of each species were involved, and they were kept together in a small room, one could not deduce from this that they would behave so in the wild, if through extension of range or human introduction they ever came together.

A cock Rosy-rumped paired to a hen Black-rumped Waxbill had many nests of eggs but only one egg, from a clutch of five (the usual number laid by the hen in question), ever hatched. This bird was successfully reared. It proved to be a hen and when adult had a rosy flush on its wing coverts and a predominantly red rump but was otherwise more like its mother in colour and had an all-red bill like hers. Its 'accent' was, however, more like its father's.

Accounts of wild nests that I have seen all seem to be derived from that of Chapin, who found a single nest, built of grass, on the ground among short grass. It had a lateral entrance but, apparently, no entrance tube or cock nest. It held six eggs, two of which were larger than the other four and were thought to be (and no doubt were) eggs of the Pin-tailed Whydah.

Immelmann et al. say that the Rosy-rumped Waxbill has often been bred in captivity and is easier to breed successfully because (they say) it feeds its young more on 'half ripe' seeds and less on small insects than other waxbills do. They do not, however, describe the nests. The above-mentioned cock Rosy-rumped that was paired to the Black-rumped hen built many nests, of which I think he was the main or sole architect, though both birds 'decorated' the upper surface of the nest and carried material to the cock nest built on top of it. Further evidence that the Rosy-rumped cock was responsible for these nests was the consistent difference between them and nests built by Black-rumped Waxbills under



(4) Diagrammatic sketch, in section, to show nest and cock nest built in captivity mainly or entirely by a cock Rosy-rumped Waxbill. (See text for details)

the same conditions and in the same room, though not at the same time. The Rosy-rumped and his mate built nests both above floor level in baskets (where cock nests could not be built) and in corners on the floor of the room. The latter were almost certainly closer to what the bird would have built in a wild state. I dissected four of such floor nests and found them all alike.

Each nest was made chiefly of grass stems, often with blades and seedling heads attached, a very few stems of other plants, such as Chickweed and Knotgrass were usually also present. The walls of the nest cavity were about an inch thick and very tough and compact, in great contrast to the nests of firefinches and cordon-bleus. The nest lining was entirely of grass. The nest was pear-shaped, narrowing to a tubular entrance with a very small and well-concealed entrance hole which was surrounded by many sharp ends of grass stems so that it was not possible to insert a finger without 'stabbing' it quite sharply on them. The cock nest (again in each case) was much smaller than the real nest but inside it was of about the same dimensions as the real egg chamber immediately below it in the real nest. It had a large side entrance and was never 'completed' so as to be a facsimile of the real nest.

The male 'decorated' the roof of the nest, especially immediately in front of the entrance of the cock nest, with feathers, preferably white or *glossy* black; pieces of white tissue paper, shiny greaseproof paper and charred and blackened paper (similar small pieces of unburned newspaper were never used) and clumps of either dry or wet earth, those with root-lets protruding from them being strongly preferred. Some of all these objects, especially white and glossy black feathers, were also placed inside the cock nest. Twice, when I placed a dead and putrescent cordon-bleu nestling on the floor, the cock Rosy-rumped showed extreme excitement and at once carried it to the cock nest and placed it inside. The behaviour of this cock in relation to the cock nest was identical to that observed in (and described above) my Black-rumped Waxbills.

At times, when I had given the birds ant pupae, there were numbers of small black ants, I believe *Lasius niger* in the room. When he and his mate had eggs, the cock Rosy-rumped Waxbill always killed, or disabled and flung away, any that he saw near the nest entrance. He ignored ants further from the nest and, like all the estrildids I have kept, never ate worker ants. I presume this is innate behaviour which functions to prevent ants, and above all the scouts of army ant hordes, from finding and entering the nest.

Some concluding remarks

I must own that, looking back, I did not have much success in keeping Black-rumped or Rosy-rumped Waxbills. Although looking healthy most of their lives, none of them lived for more than nine years and most died after I had had them from two to six years. Nor, except in the case of the one hybrid mentioned, did I succeed in breeding any.

I believe these rather poor results are comparable to those achieved (if one can use 'achieve' in this connection) by many others with these birds and possibly for rather similar reasons which are: (1) Greater involvement with other species being kept at the same time (in my case other estrildids, especially cordon-bleus); (2) The difficulty of selecting true pairs initially from the dealers, this being compounded by the readiness of the birds to form homosexual pairs if two hens or two cocks are, by mistake, kept alone together; (3) That, at least in the two species I have kept, the birds take longer (from several months to over a year) before they start to nest in captivity than do most other small estrildids. This is probably because the captive conditions are, to their 'birds' eye view', further removed from the essentials of their former wild habitat than is the case with bush-nesting species. Also, although I can truthfully state that the monetary value of a bird has never influenced *my* feelings about it, I think it likely that the fact that, at least in the past, the most

attractive of these species - the Black-rumped Waxbill - could always be obtained in limitless numbers for a trifling price, tended to discourage people from going to much trouble to try to breed it.

Perhaps things are otherwise now. I am sure that others beside myself would be delighted to read the experiences and opinions of any of our members who now keep, and hopefully breed, any of these species.

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* * *

NEWS AND VIEWS

From Rosemary Low:

Some of the pressures on birds and animals in the tropics are incomprehensible to us, such as the slaughter of rhinos for their horn which is believed to be an aphrodisiac by the Chinese. Unfortunately the bill of the Grey-breasted Mountain Toucan *Andigena hypoglauca* is also endowed with magical qualities by the people of Ecuador. On a BBC Radio Four programme broadcast in January, Adrian Barnett related how for this reason the Toucans are shot and their bodies discarded, or used to make a soup which is said to be good for chest ailments. The bill is not only ground up but also used as a charm by the people of the Rio Mezan area of southern Ecuador, in the highland forest, where the population of this Toucan is apparently small. This Toucan has the head, wings and tail black, rump bright yellow and underparts blue-grey. The bill is red, black, yellow and greenish-yellow. Adrian Barnett spoke also of the concern the local people have for the forests. So aware are they of the importance of the watersheds they create (the rivers being an important source of their fresh water), that in 1976 the people pooled their resources to buy the forest. Had they not done so it would have been purchased by a logging company. The local people understand the importance of this area of highland forest - what a pity that politicians apparently do not ...

The first Kakas *Nestor meridionalis* to be seen outside New Zealand this century now reside in Stuttgart Zoo, West Germany. About three years old, they were bred in Auckland Zoo. The Kaka is a large parrot, about 45 cm (19 in) in length. Its prominent beak, crimson hind neck and orange-yellow ear coverts distinguish it. Like the Kea, to which it is closely related, it is mainly a dull shade - greenish brown, whereas the Kea is dark olive green.

Kakas were exhibited at London Zoo as long ago as 1863 and subsequently in other European zoos. Auckland Zoo has been consistently successful in breeding this highly unusual parrot since 1981. The three or four eggs are incubated for 28 days. Newly hatched chicks are covered in white down; they spend nine or ten weeks in the nest. In captivity they feed on various seeds, fruits and vegetables, nectar and brown bread. Nectar is an important part of their diet in the wild. When feeding on nectar and pollen some of the latter adheres to their heads, resulting in cross-pollination of flax and other plants. They also consume harmful insects and grubs and therefore play a role of importance in the ecology of the New Zealand forests. Their numbers have unfortunately declined appre-

ciably due to deforestation. Not common on North or South Islands, they are more numerous on some of the small offshore islands.

Hopefully more Kakas will reach Europe, in order that this fascinating parrot can be established in European aviculture.

Last year American aviculturist Sebastian Lousada produced seven young Yellow-cheeked Amazons *Amazona autumnalis autumnalis* from one pair. Removing the first clutch of Amazon eggs to an incubator usually induces the female to lay again, thus the excellent results of Mr. Lousada's pair. But why so notable? This Vermont breeder has no mains electricity, thus the eggs were incubated in a Turn-X incubator powered by solar electric panels! Are these the world's first solar powered parrots?

Vermont is not, of course, one of the southern states. When he wrote to me about this unusual breeding, there was a blanket of snow outside his door. It is a good thing that Amazons are not winter breeders!

* * *

From David Coles

Several members of the Rallidae are spot-lighted in journals received by the Avicultural Society in exchange for our Magazine. The spring 1986 issue of the Royal Society for the Protection of Birds publication *Birds* contains the results of a research project run in conjunction with the NCC to discover the habitat requirements of the Corncrake. Undertaken on the Hebridean islands of North and South Uist, the article documents the species' habitat requirements throughout the breeding season.

African Rallidae are discussed by Colin Wintle in an article in the January 1986 issue of the *American Pheasant and Waterfowl Society Magazine*. Special attention is given to Flufftails (*Sarothrura*) and contains some interesting facts.

In the same issue of *A.P.W.S.* the breeding of the Striped Crake *Porzana marginalis* is documented and contains a wealth of information.

The colony of Griffon Vultures reintroduced into the Cevennes in France continues to thrive and is now in its third spring. Forty-three birds, including five chicks hatched in the wild, are now reported.

Australia's smallest parrot has been rediscovered in the foothills of the Lemington Plateau in Queensland. Coxen's Fig Parrot *Opopsitta diophthalma coxeni* has proved so elusive that fear for its existence

instigated a search by the Royal Australian Ornithologists' Union. Two birds were sighted on the New South Wales-Queensland border.

Cuba is the site for another important 'rediscovery'. This time the species is the Ivory-billed Woodpecker *Campephilus principalis bairdii*, the island race endemic to Cuba. Sightings occurred in the mountains some 500 miles east of Havana. Forestry operations close to where the birds were seen have now ceased.

To complete the trio of rediscoveries, Jerdon's Courser *Rhinoptilus bitorquatus* has been seen again for the first time since 1900. One was seen in Ardhra Pradesh by a scientist working for the Bombay Natural History Society. The area of scrub jungle where it was sighted is now protected.

On 10th November 1986 the Wildfowl Trust celebrated its 40th Anniversary. In that time a reputation has been built up that is second to none, be it in research, captive breeding or presentation of a subject to the general public.

The Trust's seven centres, dotted throughout the country, exhibit the largest collection of waterfowl ever likely to be seen. In recent months two species of special interest have been imported - the Freckled Duck *Stictonetta naevosa* can be seen at Slimbridge and Blue Duck *Hymenolaimus malacorhynchus* at Arundel.

Waterfowl are not the only attraction to be found at the various centres. Flamingoes have been very successful at Slimbridge and both Martin Mere and Washington can boast the only entirely captive-bred populations anywhere.

Hummingbirds are not species that you would normally associate with a specialist waterfowl collection but over the years several have bred in Slimbridge's tropical house and are still doing so.

The anniversary is commemorated in the latest issue of *Wildfowl World*, the Trust's magazine. Articles cover a wide range of subjects, illustrating much of the work the trust has done over the years.

The Royal Australasian Ornithologists Union's newsletter for March 1986 contains an article on the endangered species of Norfolk Island. Ian Rooke carried out a survey of the island's wildlife and found that several species are in grave danger of extinction, mainly through habitat loss and competition from introduced species for available nest-sites. The recently formed national park provides some hope but for species like the Grey-headed Blackbird, help seems to have come too late.

Bernard Sayers, who is organising the forthcoming Owl Symposium at Lilford Hall, Peterborough, on 10th May, had a very satisfactory season in 1986 with his collection. Owls successfully reared were:

5 Bengal Eagle Owls *Bubo bubo begalensis*, 3 Turkmenian Eagle Owls *B.b. turcomanus*, 1 Magellan Eagle Owl *B. virginianus*, 4 Tawny Owls *Strix aluco sylvatica* - 2 brown phase and 2 grey, 3 Rusty-barred Owls *S. hylophila*, 1 Kenyan Wood Owl *Ciccaba woodfordi nigricantior*, 3 Boobook Owls *Ninox novaeseelandiae*, 10 Collared Scop's Owls *Otus bakkamoena*

* * *

Donald Risdon writes from the Tropical Bird Gardens, Rode, Somerset:

'I have recently observed a most unusual activity in Royal Starlings of which I have four specimens.

'During the winter months these are housed in a greenhouse (slightly heated which maintains an average temperature of 50°F). They occupy a flight of about 12 ft by 3 ft by 4 ft high. Part of the floor of this flight is covered with dry powdery peat.

'On two occasions recently (January 1967) I have seen them dusting themselves by fluffing their feathers in the peat just like House Sparrows. The motions are the same as when water-bathing. I have only seen them doing this on two occasions, both when the daylight was fading just after sunset. This was about a month ago, and, as far as I am aware, they have not done it since.

'I mentioned this occurrence to Raymond Sawyer and apparently he too has noticed it among his Royal Starlings.

'This seems so unusual in a group of birds which are keen water bathers normally that I thought it worth while recording in the *Magazine*.'

* * *

Dr. T.R. Birkhead writes from Sheffield University with a request for information on the duration of fertility in birds:

'It has long been known that the females of several species of domesticated birds are able to produce fertile eggs days or even weeks after the removal of the male. The turkey currently holds the record; some female turkeys have produced fertile eggs ten weeks after the last mating! At the other extreme, pigeons and doves can retain their fertility for only six days.

'The duration of fertility in other birds is poorly known, and such information could be important for those engaged in breeding hybrids or

colour breeding. I am sure many breeders must have had cases where either the male has died, escaped or the pair split up, only for the female to lay a clutch some time later. Since isolated females will often incubate alone, there is a chance that breeders will also know whether the eggs were fertile or not.

'I am conducting a survey on this topic and would be most interested to hear from any bird breeders that have information of this sort. To be most useful you need to have kept some records, and in particular it would be valuable to know the following:

- (1) The date on which the female was isolated from the male.
- (2) The date on which she started to lay (and the dates of each egg, if known).
- (3) Whether the eggs were fertile and hatched.

'Records of totally infertile clutches (provided they have been incubated for long enough to check this), after hens have been isolated from cocks will also be useful.

'If you have any information on this topic, please write to me at this address: Dr. T.R. Birkhead, Zoology Department, The University, Sheffield, S10 2TN, South Yorkshire.'

* * *

Mark Hagen write from Ontario, Canada, with news of an avicultural research project which is being done with the University of Guelph as part of his Master of Science degree:

'The project utilizes 15 pairs of Goffin's and an equal number of Citron Cockatoos, as well as 80 various macaws, Amazon parrots, and others. The Citrons will be bred using three different methods: one group of five pairs will be randomly paired, a second group of five pairs will be pair-bonded and a third group of five pairs will be colony-bred in cages connected by long corridor cage. The cages for the Citrons are 8 x 6 x 6ft. We are also developing a water soluble powder of vitamins, minerals and limiting amino acids, a hand-feeding formula and palatable pellets.

'The Goffins are presently housed in a climate-controlled room at the University. Work on them will include determining the metabolizable energy (ME) value of sunflower kernels, soy beans, and the effect of naturally occurring intestinal parasites on these MEs. An attempt to breed the Goffins, using light, temperature and humidity control will also be part of the research. The other 100 parrots are housed in a 7,200 square feet warehouse off campus. The macaws are in suspended cages that are supported by 1½ in pipe on wheels and measure 12 x 6 x 6 ft. The Amazon parrots and Sulphur-crested Cockatoos are in similar cages

that measure $10\frac{1}{2} \times 5 \times 5$ ft. We have occupied this building since October 1985 and several pairs have already produced fertile eggs.'

We hope that Mr. Hagen will send reports of his progress for the *Avicultural Magazine*.

* * *

REVIEWS

THE BIRDS OF BURMA

B.E. Smythies. Nimrod Press, Hampshire. ISBN 1-85259-003-3. Price £45.

Those of us who are regularly frustrated by the gaps in the literature on the birds of the Old World tropics will be delighted to know that the long-awaited reprint of Bertram Smythies' *Birds of Burma* has now been published. Those who know the early editions (1940 and 1953) from a library or somebody's private collection, and have been waiting for years for their own copy, whether secondhand or reprinted, will be surprised to discover the book has grown. I mean physically to coffee table proportions. It is no longer a field guide, even by today's backpack standards, but a large and heavy volume. It is difficult to see the reasons, presumably the market and profit opportunity for an expensive book of this kind is considerably greater than that for a normal reference book. Unfortunately it thus demands comparison with books of similar size and cost, and falls short for such books are written with full descriptions of the birds and illustrated with supporting distribution maps and habitat-enriched portraits. Smythies' book was, and still is, a field reference guide.

Having disposed of its physical and cost drawback, it is still the best reference to the birds of Burma. The author was a member of the Burma Forest Service for 15 years followed by another 15 years in Sarawak and Brunei. During this latter period, while acting as Honorary Curator of Birds in the Sarawak Museum he totally revised and updated *The Birds of Borneo*. So he's a real field man drawing on a lifetime of personal practical field work. The list of references providing supplementary information is long and very thorough. For all this though, the text is very variable, both in quantity and quality. For example, on facing pages the Purple Sunbird *Nectarinia asiatica*, described as '.....resident throughout Burma' is given 30 lines of text which compares favourably with the Purple-rumped Sunbird *N. zeylonica*, described as '.....common in Ara-

kan', that gets only six lines, two of which are the name. In the former the female is described simply as '...brown above and yellow below'. In the latter case we are not told of the female at all.

As a finch specialist, I naturally turned to the last few pages and was disappointed to read of the Pintailed Parrotfinch *Erythrura prasina prasina* that it is '.....a Malaysian species....' and the nest and eggs are 'unknown'. Under the entry for the Scaly-breasted Munia, *Lonchura punctulata* there is mention of two races, *L.p. subundulata*, and *L.p. topela*, but no hint of how the two races differ. This would be irritating, both to the home-bound aviculturist and the bird watcher in the field. It is a failing throughout the book.

Lest it seems as though I am overly distracted by the book's failings, let me hasten to add that where there are notes on voice, habits and food, nest and eggs, based on observations by the author, they are richly informative and good reading. The illustrations are on 32 new plates from the original artwork by A.M. Hughes. They are natural posture portraits on a grey Ingres paper background and are first class reproductions. Of the almost 1000 species recorded in Burma, about 288 are illustrated.

This book deserves a place in the library of any birdman interested in South East Asia, but it falls short of being a definitive work of reference.

R.R.

* * *

THE SUNNING BEHAVIOUR OF BIRDS

By K.E.L. Simmons and R. Prytherch. Bristol Ornithological Club, c/o The Anchorage, The Chalks, Chew Magna, Bristol BS18 8SN.

Price £7.50 including postage.

All aviculturists whose birds are tame will have had good opportunities to observe the sunning (sun-bathing) behaviour of many species and the often beautiful or bizarre postures that they adopt when so doing.

In this very 'meaty' and thought-provoking paperback book, Dr. Simmons has investigated this behaviour in considerable detail and lucidly describes his conclusions as to the stimuli eliciting it and its functions. The book is well illustrated, by Robin Prytherch, with splendidly 'alive' and impeccably accurate black and white drawings of about a hundred different species in various sunning postures.

Although the book is primarily concerned with sunning behaviour in

all its aspects, the chapter (pages 82-86) comparing it with other behaviour patterns serves, in effect, as an excellent introduction to and summary of water bathing, dusting and anting.

Much of the book is based on Dr. Simmons's own acute observations but he has also consulted many other ornithologists, has thoroughly researched the literature on the subject and the book is very fully referenced.

To the reviewer, senile relict of a bygone age when it was safe to walk alone in British cities, when the fanciers had not yet transformed our Budgerigars from lively, beautiful and hardy birds to feathered monstrosities, and when paperbacked books cost 6d and hardbacks half-a-crown, the price of this book at first seemed a lot. But of course it is not. As things go today the pictures alone would be a bargain at the price.

The Sunning Behaviour of Birds can be heartily recommended to all who are interested in bird behaviour *and* to all who delight in good black and white drawings of birds.

D.G.

The Editor does not accept responsibility for opinions expressed in articles, notes reviews or correspondence.

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ADDRESS OF EDITOR

Mary Harvey, Honorary Editor, The Avicultural Magazine, Warren Hill, Hulford's Lane, Hartley Wintney, Hampshire RG27 8AG, England.



Arthur Sidey - Daily Mirror

Three-year old Rockhopper Penguin with seven-week old Humboldt's Penguins, all hand-reared at Cotswold Wildlife Park

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APRIL - JUNE 1987

BREEDING AND REARING THE HUMBOLDT PENGUIN

Spheniscus humboldti

AT COTSWOLD WILDLIFE PARK, BURFORD, OXON.

THE DEVELOPMENT OF A SUCCESSFUL
HAND-REARING TECHNIQUE

By M.G. WILLIAMS and L.P. and R.R. GOLDING

Introduction

The penguin enclosure is located within an old walled garden area of the Park and is roughly triangular in shape. It occupies a total area of approximately 300 m², some 75 m² of which are taken up by a pool. The maximum depth of the pool is one metre. The enclosure is bounded on the south and west sides by the original 4 m high boundary walls of the garden. Thus the enclosure faces generally north-east and is viewed from along the north-east perimeter by visitors. Visitors are separated from the enclosure by a 0.8 m high wall. The penguins have access to the pool by means of a gently sloping concrete ramp. This ramp also forms the route by which water flows into the pool from an adjacent waterfall. During daylight hours the water is circulated by means of a pump which takes water from the bottom of the pool and then discharges it at the top of the waterfall. Once a week the pool is emptied and scrubbed with dairy hypochlorite.

Located along the base of the high south and west walls of the enclosure are 12 nest-boxes. These are approximately 1.2 m x 0.8 m x 0.6 m high and have an entrance situated at one end, i.e., in one of the shorter sides. Each entrance faces onto the main enclosure. A wooden panel occupying half the width of the nest-box is situated 0.27 m inside the entrance to each box to act as a windbreak. The nest-box lids consist of removable wooden panels which are covered externally with waterproof sheeting. The nest-box floors also consist of wood. During the summer months areas of shade within the enclosure are provided by a tree, shrubs and vines. An artificial rock cave provides shelter throughout the year. The enclosure provides accommodation for Humboldt Penguins *Spheniscus humboldti*

and Rockhopper Penguins *Eudyptes crestatus*. At the time of writing (August 1983*) the colony consists of 5.5 breeding adult Humboldt Penguins, 16 young park-bred Humboldt Penguins and 2.2 breeding adult Rockhopper Penguins. Of the 5.5 breeding adult Humboldt Penguins, 2.4 are from the original stock purchased in November 1969 and October 1970.

The remainder of this paper refers to Humboldt Penguins only.

Diet

All our penguins are fed on sprats *Sprattus sprattus*. Frozen sprats are acquired from a fish supplier at regular intervals and stored at the park. As satisfactory air thawing facilities are not available, the frozen sprats are thawed by being placed in a container under running tap water. Although the method of thawing is always similar, it has been noticed that the quality of the thawed fish varies and presumably this is related to the method of freezing and duration of storage. Fish that are not firm to the touch when thawed are discarded as they are usually rejected by the birds in any case. The penguins are given a morning feed and an afternoon feed every day, except on Fridays when the enclosure and pool are cleaned. Apart from any very young birds recently introduced into the enclosure, the penguins are encouraged to take fish thrown into the pool.

During the afternoon feed only, one 300 mg NaCl tablet and one Mazuri Fish Eaters' tablet are together inserted into the body cavity of each of approximately 35 fish. The supplemented fish are tossed into the pool although any young birds present are first given one fish each directly by hand. It is therefore possible to ensure that on most days each penguin receives a supplemented fish. On occasions some birds take two or more supplemented fish but no ill effects have been observed as a result of this. When all of the supplemented fish have been consumed, the non-supplemented fish are thrown into the pool.

Each penguin consumes approximately 0.5 kg of fish daily. This amount varies, however, according to the time of year. During July the penguins consume larger quantities of fish than at other times and considerably increase their weight in preparation for the fast during the annual moult in July/August. During the moult the penguins consume scarcely any fish. Light feeding recommences towards the end of the moult and the normal food intake is resumed gradually over the following week or so.

*This paper was originally submitted to another journal which retained it without publishing, and it has only recently been retrieved. Despite the delay in publishing, the information remains valid.

Courtship

Once established, pair bondings have remained stable. This applies to birds of the original stock and birds bred subsequently within the colony. The breeding sites chosen by each pair, however, have not always remained constant from one breeding season to another. With the exception of the moult period and a period of approximately six weeks prior to it, our Humboldt Penguins have bred throughout the remainder of the year. However, the main breeding period here is between February and May. During the courtship period the penguins exhibit a marked heightening of territoriality and calling becomes more frequent. The territory of each pair appears to consist of a nest-box and an area of approximately one square meter immediately outside the nest-box entrance. Should a penguin stray unintentionally within the territory of another, the possessors of that territory initiate an exchange of loud calling (braying) with the intruder. In some cases this is followed by fighting. Such an exchange usually results in much braying within the colony as a whole. On entering its own territory or meeting its mate in a neutral area, each penguin sounds a recognition call. Courtship itself also involves loud braying as well as much neck and beak touching between paired birds. During periods of breeding activity the fleshy area at the base of the beak becomes swollen and reddish in colour. In the males, which are larger than the females, this change is more noticeable.

Nesting

Both adults incubate the eggs and share this duty on an approximately equal basis, changeovers occurring several times throughout the day and night. During the set feeding times the adult incubating at that time usually remains in the nest-box while its mate feeds.

Observations here indicate that the incubation period for the Humboldt Penguin is approximately 39 days and that incubation commences immediately after the first egg is laid. The second egg is laid between two and five days after the first.

Handrearing

After communicating with a number of other zoological establishments and generally reappraising our approach, from mid-1980 we adopted a policy of removing chicks from the parents immediately after hatching. A rearing room was set up in the basement of one of the animal kitchens, chosen because of its relatively cool and constant temperature. An extractor fan was fitted to provide improved ventilation. A Curfew still-air incubator was installed for rearing purposes and suf-

ficient working surface was made available for the handling of the chicks.

In the light of experience since that time, the following procedures are followed:

Nest-boxes in the main enclosure that are known to contain eggs due to hatch are inspected at each feeding time. The newly-hatched chick is removed from the nest-box immediately it is observed. Great care is taken while removing the chick as the parents are extremely protective at this time. However, within a few minutes after the removal of the chick the parents exhibit no signs of distress or abnormal behaviour. In cases where a second egg is being incubated at the time of the removal of a chick, the adult birds continue to incubate normally. As each chick is removed from its nest-box it is marked on either a leg or flipper for identification purposes by means of a harmless dye. It is then taken to the rearing room and placed in the rearing incubator which is set at a temperature of 32°C. The temperature is reduced gradually by around 0.5°C daily until a temperature of 22°C is reached. The rate of temperature reduction may vary slightly depending on the age of any other chicks in the incubator.

A healthy, newly-hatched chick has a dry, downy appearance and the yolk sac scar is dry and appears healthy. An egg tooth is visible on the upper mandible. In many cases, swelling of the neck immediately behind the head is observed. The extent of the swelling varies and appears to be more pronounced in a chick that has had a difficult hatch. However, some swelling is often seen in a chick that appears to have had a normal hatch. This swelling of the neck has been described by Dr. A.E. Anderson Brown (pers. comm.) as oedema of the neck muscles and overlying tissues, resulting from excessive use of those neck muscles during a prolonged or difficult hatch. The swelling disappears on the first or second day after hatching in all cases.

As the still-air incubator is used for the rearing of chicks (as opposed to the incubation of eggs) it is important to place simple barriers within the chamber of the incubator in order to prevent the chick from becoming too close to a heat source or becoming trapped in an awkward space around the thermostat equipment. It is unnecessary to make any special effort to control the relative humidity within the incubator. Each day the chick is removed from the incubator for a brief period during which time the incubator is cleaned thoroughly using hot soapy water and a hand-brush. While in the incubator, the chick rests on the standard wire mesh egg tray through which its droppings pass on to a removable sheet of paper below.

During the first 24 hours (day 1) it is unnecessary to feed the chick



Arthur Sidey - Daily Mirror

Six-day old Humboldt's Penguin at Cotswold Wildlife Park

as it has sufficient residual yolk to nourish it. Attempts to feed the chick are made on day 2. Liquidised food is made up once a day. Approximately 300 g of whole sprats, a 5 ml measure of Vionate powder and a pinch of calcium lactate powder are placed in a food liquidiser and 120 ml of 1% saline solution are added, the mixture being blended to a smooth consistency. Some of this mixture is placed in a 60 ml bladder syringe. The syringe is placed in a beaker of hot water until the temperature of the food is about 38°C, the approximate temperature of the regurgitated food that the chick would receive from its parents. The food is then fed immediately to the chick. The remaining liquidised food is placed in a refrigerator until required for the following feed, any unused food being discarded at the end of each day.

The chick is removed from the incubator for feeding and is held in an upright position in one hand. The forefinger of the same hand is used to raise the chick's head and open the bill. Great care is used at all times. The syringe containing liquidised food is held in the other hand and the syringe nozzle, which in the bladder syringe is around 35 mm long, is inserted gently into the chick's mouth, over the glottis and into the back of the throat. A small quantity of food, perhaps 1-3 ml, is then expelled gently from the syringe. This action initiates the chick's swallowing reflex and the nozzle is withdrawn from the mouth until the food has been swallowed. This process is repeated until approximately 5 ml of food have been consumed. The chick gradually becomes accustomed to the feeding routine and by day 3 it begins to accept food from the syringe voluntarily, increasing quantities being consumed from that time. During the first 48 hours the chick loses from around 5-10 g in weight. The first weight gain occurs around day 4 (see graph).

By the second week the chick is entirely accustomed to the feeding routine and the presence of one of the handlers is sufficient to cause it to vocalise and to raise its head, indicating its readiness to take food. The young chick rests on the tarsometatarsus at this stage.

During the first four weeks or so the chick is fed three times per day using the above mixture and procedure. The feeding times are approximately 0800, 1200 and 1700 hours. Care is taken not to over-feed the chick at any one feed as over-distention of the gut at this stage can give rise to vomiting and other complications.

Chicks showing weight gains that are significantly higher or lower than the mean during the first few weeks are often associated with intestinal infections, vomiting and a general failure to thrive or, in a few cases, to survive. Certain precautions are thus taken with all chicks to ensure acceptable weight gains during this period. The abdomen is manipulated gently with the fingertips before and during feeds so that

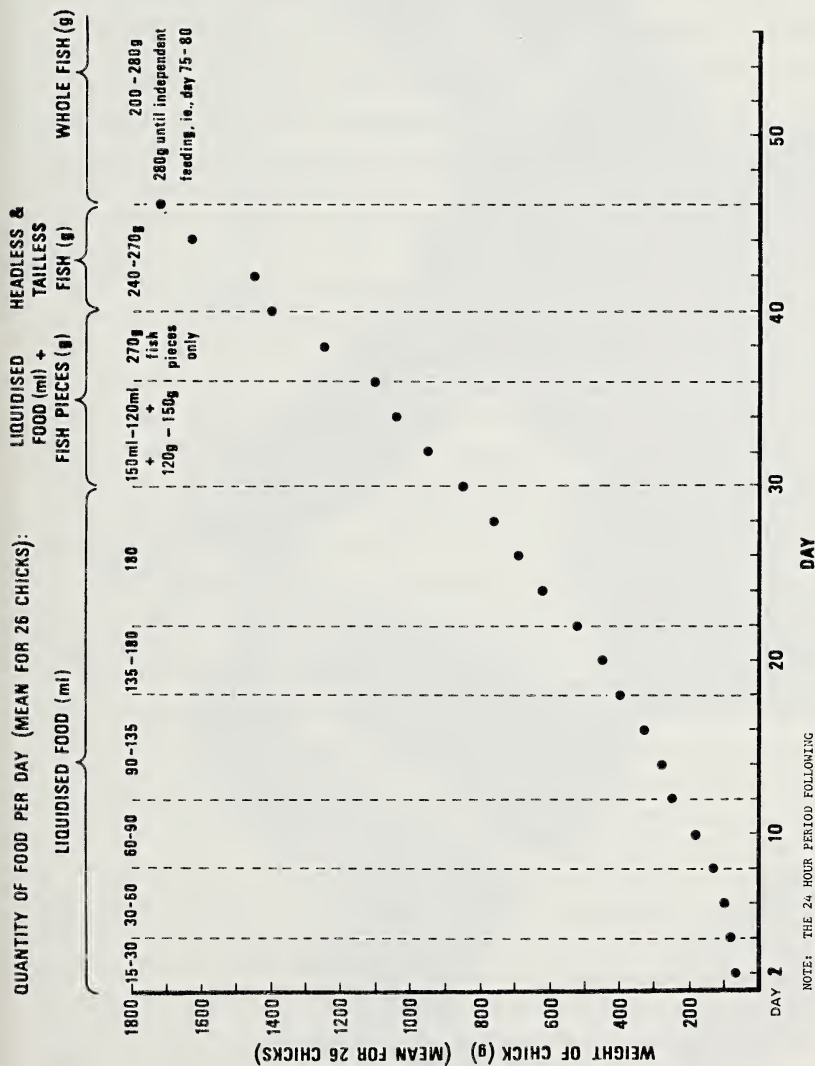


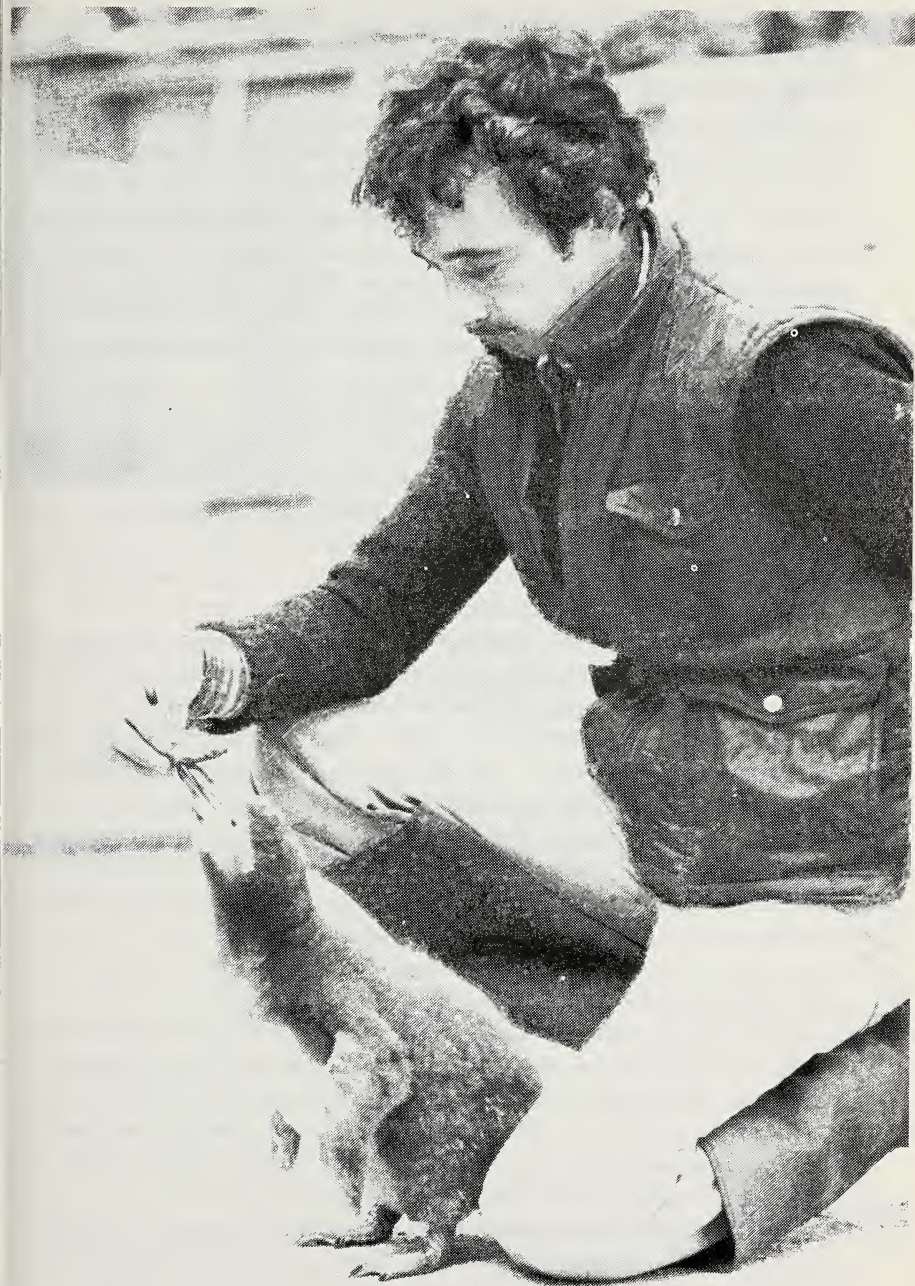
FIG. 1. CO-RELATION OF FOOD INTAKE AND DEVELOPMENT OF HAND-REARED HUMBOLDT'S PENGUIN CHICKS

the handler can gain some impression of the volume of food in the gut and can thus avoid overfeeding. It is preferable to underfeed slightly than to overfeed. A chick exhibiting weight gains that are below average may benefit from an additional feed per day for a few days.

A chick that is weak or unwell may refuse food and its mouth is examined for any signs of infection as is also the cloacal vent to confirm that excreta are being passed freely. A weak chick may also be unable to assume the correct posture in which to defaecate and excreta may then accumulate and solidify around the cloacal vent. Close observation of the faeces is maintained constantly as the presence of blood in the faeces usually indicates an infection requiring veterinary treatment. During the first seven to ten days a yolk sac infection may develop. However, it is not usually possible to confirm such an infection until after the death of the chick.

To a certain extent it is possible to maintain chicks of various ages at the same temperature in the same incubator. However, it is not recommended that a newly-hatched chick be placed in the same incubator with older chicks when the temperature in the incubator is less than 32°C. It is also undesirable to maintain a chick of three weeks old or more at a temperature of over 29°C. Thus we eventually found it necessary to purchase a second still-air incubator for use as a brooder. The chick is removed from the incubator when around 26 days old as at this age it becomes too large for the incubator chamber. The chick is then placed in a circular, open-topped container approximately one metre across, the sides consisting of a length of rolled hardboard. The base of the container consists of a fine wire mesh which is raised slightly above removable sheets of paper. The container is heated by means of an overhead heat lamp and, by positioning the lamp correctly, a temperature gradient is initially maintained of from 21°C down to 16°C throughout the day and night. When around 850 g in weight (day 30) the chick no longer requires a heat lamp and subsequently the lamp is used only if the temperature drops below 10°C.

Once the chick weighs about 950 g (day 30) it is weaned on to sprat pieces taken from filleted sprats with the head and tail also removed. Thus at this time the chick consumes around 50 ml of liquidised food plus around 40 g of sprat pieces at each of its three feeds per day. The sprat pieces are moistened with 1% saline solution or water to facilitate swallowing. It may be necessary to coax the chick into accepting these fish pieces by stroking its throat while it is being fed. However, the chick soon becomes accustomed to this addition to its diet and during the next few days the sprat pieces are increased and the liquidised food decreased.



L.P. Golding

Martyn Williams feeding seven-week old hand-reared Humboldt Penguin

By around 1.1 kg in weight (day 36) the chick is fed entirely on sprat pieces moistened with saline solution or water. The approximate intake is 80-90 g per feed. As at this stage the chick no longer receives the vitamin and mineral supplement previously included with the liquidised food, a dusting of calcium lactate and Vionate powders on the moistened fish pieces providing the necessary dietary supplements.

When the chick weighs around 1.4 kg (day 40), headless and tailless non-filleted sprats are introduced and increased gradually to replace a roughly equivalent quantity of sprat pieces. Whole sprats, i.e., including the head and tail, are introduced at around day 43.. At around this time the chick ceases to stand on the tarsometatarsus and extends the lower limb to stand on its phalanges.

By around 1.7 kg in weight (day 46) the chick's food consists entirely of whole sprats and the number of feeds is decreased to two per day, one at 0800 and one at 1700 hours. Approximately 100 g of sprats are consumed during each feed, the total daily consumption thus showing a small temporary decrease. One half of a Mazuri Fish Eaters tablet and one half of a salt tablet are inserted into the body cavity of one of the sprats given to each chick per day.

At this age the chick, together with any others of similar age, is placed in a separate pen within the main penguin enclosure during the day, provided that the weather is not too cold or wet. This pen has wire mesh sides that protect the chick from minor bullying by the more inquisitive members of the colony. A piece of roofing sheet or similar material is placed over part of the pen in order to give protection from the sun or rain. The pen has an open base so that the chick's feet rest directly on the grass or small pebbles of the enclosure. The chick and its pen are moved to a covered area of the enclosure at night for additional protection from adverse weather.

Assimilation into the colony

The initial introduction to the main enclosure of the penguin chick inside its pen results in one of two general reactions from members of the colony. As already noted, the colony at the Cotswold Wildlife Park is composed of both Humboldt and Rockhopper Penguins and while most hand-reared individuals of both species exhibit some interest in the new chick, most wild-caught individuals ignore it.

At around day 55 the juvenile plumage begins to replace the down feathers, always commencing on the flippers. Once around half the juvenile plumage has appeared, i.e. at around day 70, the chick is removed from its pen by day and is allowed to move freely within the colony. However, for the first few days it is caught up and placed back

in the pen at night. The newly-released chick is usually ignored by the paired adults. The sub-adult Humboldt Penguins, however, may bully the chick somewhat for a few days. This reaction may be due to the need to establish a pecking order. However, within a week of its introduction the chick appears to attract no further attention and is no longer placed inside the protective pen at night.

The newly-released chick has free access to the pool and while some chicks enter the water almost immediately, others take a day or so longer. The chick's ability to swim appears to be instinctive although during the first few days its movements are somewhat unco-ordinated. However, its swimming ability improves rapidly. Any down remaining at this time is quickly lost during swimming and subsequent preening. Within a week of entering water for the first time, the chick is encouraged by the handler to accept food from the hand while in the water. Thus the chick gradually learns to feed while swimming and eventually dives and competes for fish with the adults.

Abandoned eggs

There have been occasions when eggs were abandoned by the adult birds during incubation. On one occasion a clutch of two eggs was parent-incubated beyond the 30th day, i.e., the eggs were both within seven to ten days of hatching. As soon as the abandonment was observed the eggs were removed from the nest-box and placed in an incubator. Enquiries were made concerning penguin incubation temperatures and one experienced source advised that the eggs be incubated at a temperature of between 35.5°C and 35.8°C at 60% humidity. This advice was followed and both chicks began to pip normally. However, on the second day in each case it appeared that the shell membranes were drying out and that the chick was adhering to them. Warm water was then sprayed regularly from a fine spray onto the egg, internal membranes and the emerging chick. Both chicks were still unable to complete the hatching process and thus a pair of blunt forceps was used gradually to remove pieces of shell until the chicks were free. The chicks were subsequently hand-reared and reunited with the main colony as described above.

Subsequently, another clutch of two eggs was abandoned within a day of the second egg being laid. These eggs were placed in an incubator and were successfully hatched and the chicks reared, this time without any hatching difficulties.

Conclusion

Prior to mid-1980 only one chick was reared to independence by its

parents out of approximately 40 eggs that hatched. From the start of the hand-rearing programme to August 1983, 26 chicks were reared to independence from a total of 32 that were removed from their parents at hatching for attempted hand-rearing. The success rate is thus approximately 81%.

Products mentioned in text

Dairy Hypochlorite. Manufactured by F.B.C. Ltd., Hauxton Cambridge, England.
Mazuri Fish Eaters Tablet. Manufactured by Special Diets Services Ltd., 1 Stepfield, Witham, Essex, England.

Curfew Still-Air Incubator. Manufactured by Curfew Incubators, South Minster Road, Althorne, Essex, England.

Vionate Powder. Manufactured by Squibb and Sons Ltd., Hounslow, Middlesex, England.

Bladder Syringe. Manufactured by Monoject, Ballymoney, County Antrim, Northern Ireland.

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NOTES ON THE BREEDING BIOLOGY AND ECOLOGY OF THE MARIANA OR GUAM CROW

Corvus kubaryi

By GARY A. MICHAEL
(Minneapolis, USA)

Of the 40 species of so-called true crows in the family Corvidae, the Mariana or Guam Crow *Corvus kubaryi* is one of the least studied and only the Hawaiian Crow *C. hawaiiensis* is rarer.

The only corvid in Micronesia, it is found only on the Western Pacific islands of Guam and nearby Rota. On Rota, the viability of the crow population is unknown, and on Guam, a U.S. territory, it is in danger of becoming extinct as a result of several factors, the most serious of which is now the introduced Brown Tree Snake *Boiga irregularis*. Basically a nocturnal reptile, this snake is a specialised predator of birds and their eggs. Either accidentally or deliberately introduced into Guam in the 1940s, the Brown Tree Snake is now thought to be the primary cause of the near extirpation of the entire native forest avifauna of the island. Nesting crows had not been observed since 1983 (R.E. Beck, pers. comm.). In 1984 the crow was one of five species and subspecies endemic to Guam which were added to the U.S. Federal Endangered Species List. The population of the crow on Guam was then estimated to have been as low as 50. And, at that date, very little else was known about it.

1985 as a representative of the Philadelphia Zoological Garden with the goal of studying this little-known species which was fast disappearing on the island. During two months there, I studied the breeding biology and ecology of the species. The field work was done at the invitation of, and in association with, the Guam Division of Aquatic and Wildlife Resources (GDAWR). Since the Philadelphia Zoo has led a programme among several U.S. zoos to preserve the remaining forest birds of Guam through captive propagation, my mission was to study the crow in its natural habitat in an attempt to gain insight into its captive breeding needs. The data gathered in the field would be interpreted to simulate the natural requirements of the species in captivity in order to maximise the chances of successful propagation.

Methods

The crow is a forest dweller and, as in any field study, the species was observed on its own terms. Fortunately, with the assistance of the

U.S. Air Force, I received permission to have access to jungle forests off-limits to the public. The site of the study area was Andersen Air Force Base, a U.S. military post at the northern end of the 32 km-long by 16 km-wide island. To date, much of the land on the base has been undisturbed for at least 40 years and, as an area off-limits to the public, has been preserved from the general expansion of human population and commercialisation on Guam. There the last remnant climax or well-developed forests remain. Fortunately, the military also considers the area a wildlife sanctuary.

From 22nd September to 24 November, I logged from 56 to 77 hours of field observations each week. Zoo and GDAWR officials had hoped that the two-month period would provide ample time for observation of a complete nesting from egg-laying to fledging of young. Although the crow was thought to nest year-round, the information available on its breeding biology indicated a heightened period of egg-laying from September to November, or from the latter portion to the end of the four- to six-month long tropical wet season. Of course, a pair of active nesting adults had to be located before anything could be achieved.

Since this wary and shy species has historically fled expanding human population, a bird-observation blind was used to observe the sexual differences, food habits, adult pair behaviour, and nesting activity, and to record vocalisations at close range. Discovering the crow's indifference to stationary automobiles, I found that I could also use my vehicle as an acceptable blind in the woodland at times. A heavily used, grid-like road system through the forest on the base had accustomed a large sample of the crow population to vehicular traffic. As a consequence, my automobile became useful in observing intra- and interspecific relations and in determining territory sizes.

To conduct a census, I played a particular crow call on a cassette tape player. This lured live crows to the source of the call and, therefore, within sight. At this time GDAWR field biologists are evaluating this method as a means of censusing the species.

RESULTS

Description

A typical crow in body and colour, the Guam species can be described simply as a smaller and duller version of the common North American Crow *C. brachyrhynchos*. But, to be more specific, it has brown, short wings, a green gloss to the head plumage, and a blue gloss to the body plumage. The beak and feet are black. There is a slight sexual dimorphism in the species; the adult female is not as robust as the male, and her plumage has a brownish cast. These characteristics, though subtle,

are reliable in identifying the sexes of a pair in the field.

Young birds are described as being like typical crow juveniles (Tomback, unpubl. 1980). Unkempt in appearance, the juveniles have short, fluffy head plumage and wing feathers which may be worn at the ends. Where dark contour feathers on the breast are disarranged, exposed feather bases show as light patches. Body plumage lacks the gloss of the adults', and ranges from chocolate-brown to blackish brown.

The populations of the species on Guam and Rota are described as identical in appearance.

Feeding habits

An omnivore, the Mariana Crow forages most commonly in the jungle understory, in the forest canopy, and occasionally on the forest floor. Marshall (1949) reported that the diet included miscellaneous plant material, flowers, insects, lizards and birds. Jenkins (1983) reported them as eating seeds, fruits, foliage, birds, bark and arthropods.

My observations of the foraging activity of breeding and non-breeding birds occurred during the wet season and the beginning of an early dry season. Those birds which I observed were highly carnivorous during these times. Food items included seeds, fruits, arthropods and lizards. On one occasion I witnessed a crow eating a Brown Tree Snake approximately 0.3 m long.

Crows under observation frequented *Cocos nucifera*, *Pandanus* sp., *Ficus* sp. and *Artocarpus* sp. in search of animal foods. They collected seeds from miscellaneous plants, but, in my period of observation, chose mainly various ficus fruits. Arthropods, lizards and the one snake seen eaten were extracted from crevices at the bases of coco fronds and pandanus leaves. Crows also frequently caught insects and lizards on ficus in the understory; they also commonly gathered insects from dead artocarpus. In this case, the birds would deliver woodpecker-like blows to the branches and then tear off bark and dead wood in search of boring insects. This method of feeding upon insects may have given rise to the eating of bark by the species. Although my data are insufficient to refute the findings of Jenkins (1983), they do suggest that the crow eats neither foliage nor bark. Crows hold both vegetable and animal foods with the feet and tear off bite-size pieces with the beak. While watching crows foraging in pandanus, I discovered one of their water sources. Leaves which grow at the terminal end of pandanus branches form a natural cup that holds rainwater, and crows have learned to utilise this resource.

Vocalisations

The adult Mariana Crow demonstrated five different types of vocali-

sations during my field observations on Guam. The *locational* or *identification* call, a higher pitched version of the *caw* of the North American Crow, was most often heard. The call was used to identify the caller or to indicate the caller's location. Only used by a member of a pair to communicate with its mate, the call was ignored when elicited by a third bird. On one occasion, the individuals of a pair, visually isolated while foraging some 55 m apart, maintained a dialogue of locational or identification caws for 22 minutes. Alternating, the birds called approximately every 15 seconds. In addition to using it when foraging, the crow also produced this vocalisation when perched, when flying, when chasing an intruder in its territory, when accompanying its mate in a chase, and when flying as a flock member.

The *alarm call* consisted of a series of rapid identification caws. This was heard when a bird or its mate faced crow or human intruders and was startled.

The *harsh locational caw* was a loud, low-pitched guttural squall used by breeding and non-breeding pairs at nest sites. When producing this call, the bird assumed a parallel or horizontal position to the perch, ruffled its body plumage, fanned its tail feathers, and raised and lowered its closed wings. Although both sexes used this call, the male produced it more frequently. Among situations in which this vocalisation was heard were the following: when the crow was perched in the nest tree or occupying the nest as an intruding crow or crows flew through the territory; when one crow was at the nest as its mate landed nearby; when the female was at the nest during a chase of intruding crows by the male; when a bird was adding nesting material to the nest; when it was responding to the same call from another bird. Individual crows or flocks could be lured to the sound of broadcasts of this call.

The *monologue*, composed of several whines and gurgling sounds, was heard when the adult pair foraged together.

The *hunger call* consisted of a series of gurgled *aaa* or *rrr* sounds accompanied by wing flutters. This call was produced by the female only. She engaged in this when the male fed her; she called when foraging with her mate and when incubating at the nest.

The vocalisations of subadult crows have been described by Tomback (unpubl. 1980). On one occasion I observed two subadults on the wing in pursuit of an adult. Both were producing a series of whiney, high-pitched caws.

Breeding behaviour

During my two months on Guam, I was able to observe two pairs of crows engaged in nesting activity. One pair was first observed building a



Gary Michael
The Mariana Crow nest. It is composed almost entirely
of twigs from the *Elaeocarpus* tree



Snake-proofing the 12 m tall nest tree of the Mariana Crow

nest shortly after my arrival but had not yet completed it at the date of my departure. A second nesting pair, discovered five weeks after my arrival and then just beginning to construct a nest, was the first active nesting observed in recent years. Although this pair did not produce young, the activities of this pair, combined with observations of the other pair, added to the understanding of nest construction, the roles of male and female in nesting, and their relationship to other crows.

Beginning on 22nd October, I observed the entire construction of a nest by the second pair. Near the crown of a live, 12 m *Elaeocarpus sphaericus*, the nest site was in a cradle of 5-8 cm branches growing first horizontally and then vertically. Foliage shaded the nest-site the entire day. (All the old crow nests which I found in the forest, except one at approximately 6 m in an *hernandia* tree, were located at about 12 m in an *Elaeocarpus* tree in branches as described above.).

Constructed in seven days, the nest was composed entirely of *elaecarpus* twigs, soft fibres of dead coco palm fronds, and *pandanus* leaves. It was begun as a ring of 0.6 cm twigs to which other twigs were added for five days.

Both sexes engaged in nest construction. They also collected twigs together, flying to an *elaecarpus* within their territory and returning with beaks full of twigs. The birds hopped about branches and snapped off dead twigs with the beak. As they collected the material, they frequently engaged in the monologue vocalisations described earlier.

During the construction of the nest cup within the twigs, the female spent two days stripping long pieces of dead coco palm frond or *pandanus* leaves from plants growing near the nest site. Upon adding this material to the nest, she formed the inner cup by moving her breast from side to side. Construction by the female of the inner cup occurred during the entire day, as had construction of the outer nest by both sexes earlier. During the construction period I was not able to locate the roosting site of the pair.

On the seventh day of construction, copulation was observed at the nest. Monologue-type vocalisations by both birds accompanied the act. The female also completed the cup structure that day. The overall dimensions of the completed nest were 41 cm by 30 cm by 10 cm deep. The inner cup measured 13 cm by 13 cm and was 4 cm deep at its centre. The *elaecarpus* twigs surrounding the soft, well-structured cup of coco palm and *pandanus* fibres ranged from 0.2 cm to 0.6 cm in diameter and were 15 cm to 20 cm in length.

On the eighth day an egg was laid. During this day the female sat in the nest for extended periods in the morning and sporadically in the afternoon. The male was not attentive to her during these periods. When

she was not on the nest, the pair foraged together in the thick understory no more than 27 m from the nest. On the ninth day incubation apparently began. The female remained quietly on the nest all day except for four periods of 15 minutes or less of foraging within, again, 27 m of the nest site.

During her foraging periods, usually twice in the morning and twice in the afternoon, the male performed incubation duties. She never left the nest unless he was nearby. Upon her leaving, he immediately began incubation and did not leave the nest until her return. On several occasions she perched in the nest tree and preened before returning to the nest. The relationship of the pair followed this routine throughout the time of incubation.

The male was very attentive to the nest and his mate. In addition to actively guarding the nest and the pair's territory and relieving the female in incubation duties, he also fed the incubating female. Throughout the day, the male remained close to the nest site, primarily either guarding the nest or foraging within the area. At least twice an hour he fed the incubating female. Upon his arrival at the nest, she produced a hunger call and fluttered her wings, begging for the food item. All food items were carried whole in the beak.

During the cool early morning and less frequently at dusk, the male foraged in open sunlit areas, but spent the late morning and afternoon in the shaded forest understory. On cooler and cloudier days, activity in open areas increased. Foraging activity ceased with the advent of rain.

Showers were frequent in the wet season. As soon as a shower began, crows dived into the understory and remained there until the rain ceased. Then the crows ascended to the tops of tall, dead trees and, facing into the wind, preened and fanned their wings to dry their plumage.

When the male was not foraging, he usually perched just below the nest or at the crown of an adjacent tree some 14 m up, viewing the entire territory. Much of the morning, the most active period for individual crows or flocks, was spent by the male in escorting birds out of the 1.9 km² territory. (A typical crow territory varied between 1.6 and 2.6 km².) Upon sighting an intruder, the male gave a harsh outcry of a caw and flew several metres behind the individual crow or flock until it (they) left the territory. If an intruder's flight was going to impinge directly upon the nest tree, the male altered the other crow's course by dogging it with repeated interception flights. In these drives physical contact was infrequent, but once, as a part of a 20-minute long chase, an intruding male from an adjacent territory was grasped by the feet of the pursuing male. They fell approximately 18 m before separating at a metre above the ground. This was the longest chase observed, but the total time spent by the male in active defence of the territory averaged 2-3 hours per morning.

Upon examination of the nest on 31st October, a single egg was found. It was light blue with chocolate brown flecks. The egg was neither measured nor weighed for fear of damaging it or causing nest desertion. It was, however, roughly estimated to be 30-35 mm x 20-25 mm in size. On the 20th day of incubation, the pair abandoned the nest. When the nest was examined, it was found to be empty. Since the nest site had been snake-proofed with a metal collar, the egg had probably been infertile and had been removed by the birds at the end of the incubation period. GDAWR officials and I had estimated that the incubation period would be 18-21 days in length.

This unfortunate turn of events obviously precluded any observation of parental care of the young. However, Jenkins (1983) reported that both sexes engage in feeding the young.

Family groups

During my stay on Guam, I was able to observe briefly only one family group consisting of two subadults and one adult. The young birds could be identified by their chocolate brown plumage and loud, insistent whining calls. The three birds were observed as transients flying through the territory of the nesting pair. The young trailed a metre or less in flight behind the adult, which appeared to be a female.

Flocks

Flocks under observation varied from 3-13 in number. Jenkins (1983) had observed a flock of 14 individuals. Three flocks composed of 5, 9 and 11 members were seen with frequency. These groups appeared to be separate and static in number, but limitations of observation prevented any analysis of flock structure or function. Except for the one occasion mentioned above, flocks did not seem to represent family groups either behaviourally or physically.

Interspecific interactions

Few interactions between the Mariana Crow and other species of birds were observed. Crows, both in flight and while foraging, were buzzed or physically attacked by the introduced Black Drongo *Dicrurus macrocercus*. At times crows fled from these attacks; at others, they ignored such antagonistic behaviour. On one occasion, when a transient drongo flew near a crow nest site, the occupying crow responded with a harsh vocalisation and aggressive posture, but did not pursue the intruding bird.

Population

Historically, the Mariana Crow ranged over much of Guam (Jenkins,

1983). The species was once common throughout the mature and second-growth forests of the entire northern half of the island and in the many ravine forests of the mountainous southern savanna, but it has greatly declined in numbers and area inhabited since the 1960s (Jenkins, 1983). During my stay on Guam, I found crows only in mature and second-growth forest and coastal strand vegetation on the northern third of the island.

Estimates of the current population vary considerably. Since the crows are both highly mobile and wary, they are more often heard than seen. As a consequence, a totally unreliable census method has been unavailable. However, using a previously untried method, I estimated a population at the time of 100 crows, of which only three juveniles or sub-adults were observed. My census method consisted of playing a cassette recording of the harsh locational or squall call (the only call to which breeding and non-breeding birds consistently responded) every 0.5 km in the northern third of the island. This method is currently being evaluated by GDAWR field biologists.

Discussion

Although the complete biology of the Mariana Crow or of any species cannot be determined in a two-month period, my field work represents the most complete study of the species to date. Application of the knowledge gained through this field study to wildlife biologists' management of the species in the wild and to future propagation programmes in zoos could contribute greatly in the ultimate conservation of the species. The data gathered on identification of sexes, behaviour of nesting birds, normal social behaviour of the species and interpretation of vocalisations provide information useful in the long-term management, especially in captivity, of the species. Knowing this information, zoo personnel can simulate a more natural and less stressful captive environment more conducive to successful maintenance and propagation of the species. Although no crows have thus far been collected from the wild for captive propagation efforts, the results of the field work have already proven of value to the understanding by wildlife biologists of the natural history of the bird and in conducting a more accurate census on Guam (R.E. Beck, pers. comm.).

ACKNOWLEDGEMENTS

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THE SAFFRON FINCH

Sicalis flaveola

By ROBIN L. RESTALL

(London)

My first experience with the Saffron Finch was as a lad, shortly after the war. In those days our (a short-lived trio of a partnership) bird-keeping was very much of the home-grown variety and the only bird we could afford to buy was a cast-off hen canary, which was kept in a converted soap-box by a close friend of mine. Our ambition was to obtain a fine cock finch of some kind and run it with the canary. Then we would soon all have birds of our own. I saw an advertisement on a postcard in a newsagent's showcase: 'For Sale. Cock Saffron Finch, lovely condition', and there was an address nearby. A cousin and I soon found ourselves in the attic flat of a pensioner who I seem to remember had a dozen or more cages with canaries, mostly double-breeders. There, in a budgie show cage, was an immaculate and beautiful Saffron Finch.

"What d'yer want it fer?", and we explained our desire to find a good cock finch to run with our hen canary. " 'Course it'll breed beautifully wi' canary. But I want 7/6d."

We went off to consult with the third member of our bird-keeping trio, the boy who had the canary. Seven-and sixpence was a lot for us then (about 37 p today!) as we only made 2/6d delivering newspapers. What decided against it for us though was the question raised by the canary-owner, but unanswered by any of us: "If it's such a good breeder with a canary, why didn't *he* do it then?" Our instincts were correct, of course, for the genus *Sicalis* is far removed from *Serinus*. In fact, the Saffron Finch might not even be a finch at all!

It is an easy bird to describe. The adult male is greenish yellow above, pure yellow below. The forehead is orange. The flight feathers are blackish, edged with yellow. The bill is horn with the upper mandible darker than the lower, the iris is brown, the feet flesh-coloured. In size it is about the same as a House Sparrow. The adult female is very similar but can be told apart more easily in some races than others. Generally, she is a little duller, slightly more streaked above, the orange of the forehead being less bright and less extensive. In size, she is a little smaller on average.

I am indebted to Franz Robiller for information on races and distribution of them. The nominate *Sicalis flaveola flaveola* (Linnaeus):

Venezuela, north Columbia, introduced to Jamaica; *S.f. braziliensis* (Gmelin): north-east and south-east Brazil; *S.f. pelzelni* (Sclater): south Brazil, south Bolivia, north Argentina, Paraguay, Uruguay; *S. f. valida* (Bangs and Perrard): south-west Ecuador, north-west Peru. The nominate race was introduced to Trinidad and Tobago from Venezuela, and to Panama from Colombia (French).

The Brazilian/Argentinian race is usually referred to as Pelzel's Saffron Finch in the literature. It is the smallest of the races and is further distinguished by being streaked on the flanks. The Peruvian race is referred to by advertisers, invariably, as the Giant Saffron Finch. Indeed, it is the largest race, and is the one that is regularly imported into England. Pelzel's bird is occasionally available on the continent but I can't recall seeing it advertised. The other two races are never available. I have not kept Pelzel's Saffron Finch, but as far as I can tell from the literature, it requires the same treatment and has exactly the same behaviour as the Peruvian and Venezuelan races, both of which I am very familiar with. There is an excellent account of it by Arthur Butler in his classic *Foreign Finches in Captivity*, as relevant today as when it was written.

The Peruvian race is the most difficult to identify, for the sexes are very similar. In several known true pairs I have found the male to be *slightly* larger, bolder and more strongly coloured, but these are birds of approximately the same age. From young birds of this race that I have bred myself, I have had the same difficulty and must conclude that there is no consistent difference in plumage between the sexes in fledgeling or juvenile plumage. Please note that Saffron's Finches may not acquire full adult definitive plumage until their third year, invariably their second year, and will not only pair up but will breed in the juvenile plumage.

The Venezuelan race can be told apart at any age. The band of yellow suffusion across the breast and nape of the neck in fledglings is about 30.0% to 50.0% broader in young males. In second year birds this is singularly apparent. In full adults the female's mantle is noticeably more olivaceous, while the orange forehead extends to the crown on the male bird.

The contact call of the Saffron Finch is a *zitt*, quite penetrating and difficult to locate. There is a short but elaborate greeting call and display, when birds known to each other will raise their bills skywards in the manner of American grackles. Indeed all of the display between paired birds and birds known to each other reminds me of cowbirds and grackles. The song of a healthy male is persistent and regular. It is not of the quality of *Sporophila* seedeaters, but is nonetheless a pleasant

sound. It is very much part of the background noise around the house and garden of anyone who has lived in Saffron Finch country. For an expatriate European it replaced the chirruping song of the House Sparrow (but if only the House Sparrow could chirrup thus!).

During my three years' residency in Venezuela I had plenty of opportunity to study the Saffron Finch. For over a year during which I lived in an apartment block on one of the many hillsides of Caracas, I followed the routine of setting one or two trap cages baited with fruit, mealworms or seed in one corner or other of the garden. My objective was to catch and band the birds in the vicinity and be able to identify them subsequently when flying free. A pair of Saffron Finches were resident, nesting in a hole by a water tank in the penthouse above our apartment, and they were daily visitors to our balcony. The similarity in behaviour between the Saffron Finch and the House Sparrow is interesting, and not simply because of its preference for nesting in the eaves of a house. Incidentally, the Venezuelan name for the bird is *Canario de tejado* which means canary of the rooftop. The pair seems to be very firmly bonded, each following the other as they go about their territory. It is rare to find a solitary Saffron Finch, and as a rule, a lone bird on the lawn suggests the other (usually the female) is on the nest.

They are very intelligent birds. Having caught one of a pair, the only way to catch the other is to use its mate as a decoy. Once caught it is extremely unusual to catch the same bird twice, and never in the same trap or the same location. One pair I caught I kept for a while and their territory was soon taken by a pair of birds in juvenile plumage. When released the old pair quickly reclaimed their territory, and saw the innocent usurpers off. From time to time I would catch birds in juvenile or near-adult plumage and could usually catch the partner for despite the presence of the resident full-colour birds, the un-caught bird would not leave without its mate.

The loss of a mate does not result in the widow (or widower) remaining single for long. I have found it relatively easy to replace lost birds with an acceptable new spouse.

Saffron Finches are birds of parkland, gardens, town and village. They seem to be found as close to man as the House Sparrow is and offhand I cannot recall catching it at any of the study areas out in the deep countryside. The comparison with the House Sparrow is deliberate for it appears to be one of the few species that has not been ousted from its habitat by that introduced interloper. Indeed, the range of the House Sparrow in South America seems to have been limited by the resistance of the Saffron Finch. In Jamaica I understand that the Saffron

Finch was introduced *after* the House Sparrow, and successfully supplanted it.

Saffron Finches walk, not hop, and normally feed on the ground searching for fallen seeds and other edible matter. They can be maintained successfully on a standard foreign finch mixture of millets and canary seed, plus some other supplements. Bird I have kept have eaten apple, orange and most fruits; seeding grasses and greenfood may be taken. Water should be in drinking and bathing containers as they love bathing and this should be remembered when planning housing. Grit is essential, as is cuttlefish 'bone'. In my planted aviary I have watched my adult Saffrons biting pieces from the edges of the leaves of most every plant, including laurel.

They are easy cage birds to keep and maintain in good condition whether accommodation is a relatively modest cage or a roomy aviary. They have bred often enough in cages to prove this. In my experience they are at their best in an aviary with a shelter or indoor enclosure. This permits the female to escape the male when his mating overtures become overly aggressive. It seems as though *some* chasing and aggression is necessary to stimulate ovulation by the female. In my earlier notes (Restall, 1975) I described the species as having a tendency to be '..... rumbustious and rather bullying. The two sexes engage in a lively courtship. When breeding they are not suitable birds for crowded aviaries.' Having written that advice for the world at large, some 15 years ago, I recently acquired some Peruvian Saffrons and eventually placed a pair in my large, planted anddare I admit it?overcrowded aviary.

The problems began when the hen went down and began to lay. The displays of territorial defence by the male became quite aggressive. Round about this time I had been forced (?) by lack of space elsewhere (plus the usual pressure of optimism and wishful thinking) to add a trio of Puna Yellow Finches *Sicalis luteo*. These birds had been very passive in a cage, bickering vociferously otherwise sitting almost sullenly. In the aviary they came to life. The two cocks chased each other about and whenever one was in the flight (the other being indoors) it sang very sweetly indeed. A week or so after their introduction my wife called me urgently and we watched horrified as the two Saffron Finches, working as a beautifully coordinated team, attacked one of the Puna Yellow Finches. The three, locked together, fell to the ground feathers flying. I ran into the garden clapping my hands and shouting. I promptly removed the innocents and in the doing found the Saffron Finches' nest. In it I could feel, but not see, tiny bodies.

The nest was in a bank of hay built in a tenement frame on a wall

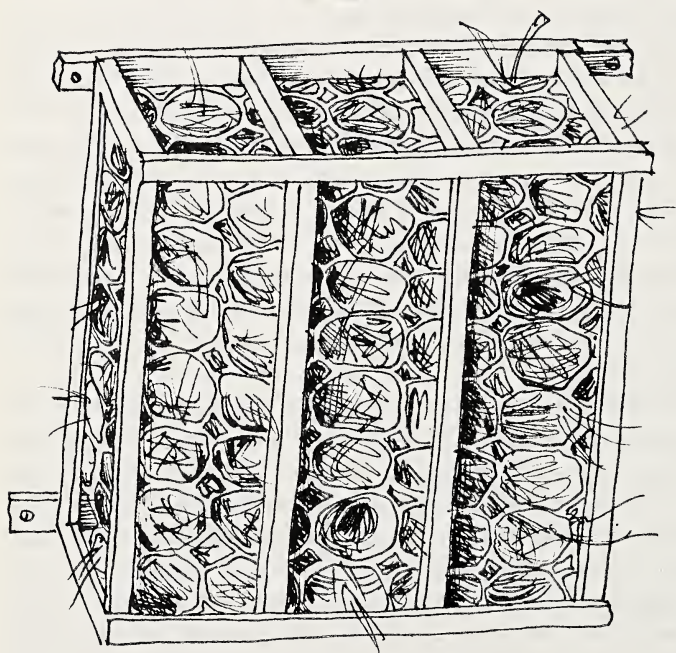
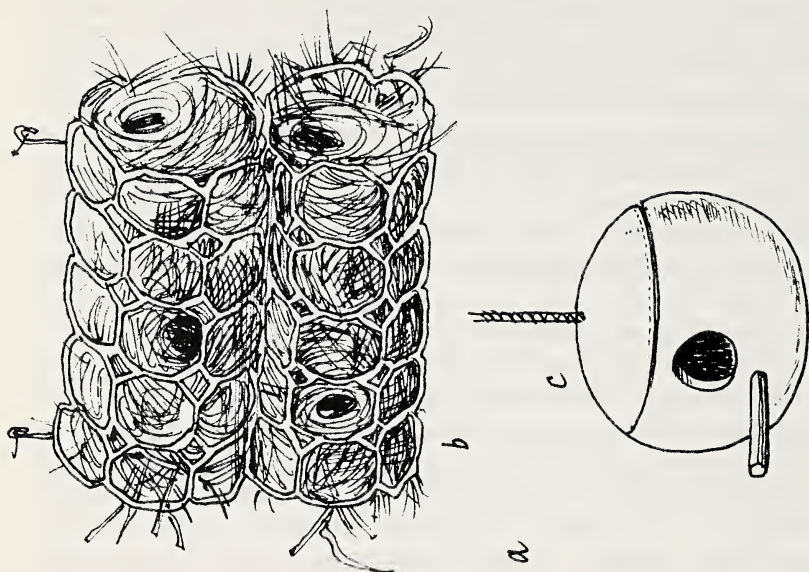
inside the shelter. It is a nesting site I learned from Mike Fidler and has proved to be the most acceptable - and successful - device that I have ever used to encourage nesting. Since building the original wooden frame some 3 ft wide x 4 ft deep x 8 in front-to-back (0.91 x 1.22 x 0.002 m), lined with large hole (3 in - 0.075 m) plastic garden mesh and stuffed with hay, grasses and fir branches, I have developed a figure-8 double roll that has encouraged Saffron Finches, munias, seedeaters and bulbuls, Cuban Finches and waxbills, all to build, lay and (sometimes) successfully rear young.

Within a few days - during which time I was out of the country on one of my too-frequent business trips - three birds were killed, all inside the shelter. Upon my return I promptly took the nestlings out of the nest in the hope that such action would knock the Saffrons 'out of synch' in their breeding cycle, and may be put them back into courtship and nest-site prospecting. This it did, and to my delight this time, they chose a hanging terracotta pot. This kind of utensil is sold in the United States for birdlovers anxious to attract breeding birds to their gardens. That brood was deserted unfortunately, due to my inspection, I am sure. The nestlings were about three or four days old, and I was due to fly to Germany for a couple of days. I reckoned that upon my return they would be ideal for lifting for hand-rearing.

Meanwhile, the first brood had been taken at about eight days. They responded to the touch of a spatula at once, and were very satisfactorily reared on Frank Meaden's Avivite 248 rearing food. At about three weeks I interspersed the 248 with a Japanese hulled millet sold in Japan for hand-rearing Java Sparrows, Budgerigars, Lovebirds, etc. (most pet birds are sold in the nestling stage in Japan). These little balls seemed to fascinate the young Saffrons and enabled a very efficient and easy weaning onto regular seed. The 248 was very satisfactory, there being no stress marks in the feathers as can sometimes be seen in the tail and wing flights of hand-reared birds that suffer a 'hiccup' in their rearing from parent/natural to hand-reared.

I have passed the parents on to Peter Olney, Curator of Birds at London Zoo, and have every hope that they will breed in the more appropriate environment of a big aviary at the Zoo with only a few Glossy Starlings, etc. to bully about! I have kept a hand-reared female and intend to run her this year with a male that Desmond Williams is holding for just this purpose.

The enclosure my Saffrons bred in is a planted flight, almost 30 ft (9.14 m) long, in an L-shape across the foot and up one side of my tiny Victorial terrace garden in the heart of London. I gave a few mealworms each day. These were snapped up by a pair of Black-faced Grassquits and



Three kinds of nesting receptacle: a) the wooden-framed tenement, and b) the figure-8 roll of mesh, both stuffed with grasses and hay; c) hanging terra cotta globular nest pot.
(Drawings by the author)

a pair of Painted Buntings. I think the Saffrons took a few, but never showed much interest. All the usual seeds were available but soft foods, rearing foods, etc., all seemed to be totally ignored. I believe the nestlings were reared to their 'natura?' eight days very largely on seed and planted-flight gatherings.

My conclusions about Saffron Finches are that it is a much more beligerent-when-breeding species than I had estimated. During a visit to Australia this year, I learned that *S.f. pelzelni* is firmly established as a breeding bird in many Australian collections. It breeds as freely there as does the domestic canary. Reports from Australian breeders of the species fully confirmed my own experience detailed above, although never in such strong detail.

In behaviour I find the Saffron Finch to be noticeably different from other *Sicalis* I have kept, being much more like a typical cowbird or grackle. However, Charles Sibley's work on egg white protein analysis indicates that the Saffron Finch is, in fact, a tanager. It is a very bold and attractive bird for a dull, dark and drab garden. There is no doubt it could easily be *established* as a self-perpetuating breeding species in British aviculture - the small ads. in *Cage and Aviary Birds* for 'EB. Giant Saffron Finches' add their testimony to this belief.

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CHESTER ZOO - 1986

By Dr. ROGER WILKINSON
(Curator of Birds)

The highlight of 1985 was the hatching and hand-rearing of a female Andean Condor *Vultur gryphus*. In 1986 this success was consolidated by the hand-rearing of two more Condors, both females. The first egg laid was once again smashed by the male but we managed to remove the second and third eggs for artificial incubation. The last egg removed was replaced by a wooden dummy egg and both parents sat this for the full incubation period. Although we must as always 'play it by ear', this gives us more confidence in perhaps allowing the parents another attempt at natural incubation and rearing. The Bateleur Eagles *Terathopius ecaudatus* and Wedge-tailed Eagles *Aquila audax* both built nests. Copulation was frequently observed between the Bateleurs but so far this has failed to signal egg-laying.

The Great Eagle Owls *Bubo bubo* reared two young and likewise the Snowy Owls *Nyctea scandiaca*. In both species the pairs that reared two young last year did the same this year. The second and more recently established pair of Snowy Owls made their first nesting attempt. The female Snowy Owl, received from Rotterdam in 1984 and paired with the five-year old Edinburgh male, laid a single egg which it then proceeded to ignore. The young female Great Eagle Owl hatched at Chester Zoo in late May 1985 laid its first egg at only 10 months old. Not surprisingly this very early breeding attempt was unsuccessful - perhaps just as well as it remained with its brother. We had not expected any breeding attempt so young but must now exchange one of these siblings for an unrelated partner or dispose of both of them.

The African Spotted Eagle Owl *Bubo africanus* originally obtained from London Zoo in 1960 died after 26 years in the Zoo. This period of residence is unlikely to be equalled by the resident only lady of the owls, the female Vermiculated Fishing Owl *Scotopelia bouvieri*. She was presented to the Zoo in 1969 having, I am told, flown onto a boat off the coast of West Africa. Repeated attempts to find her a mate met with no success and now, showing signs of senility, it looks extremely unlikely that she will be paired.

Two pairs of Barn Owls *Tyto alba* reared a total of nine chicks over the summer. Eight of these young were given to Dr. Carole Hackney who for a number of years has been co-ordinating the release of these birds in Cheshire. These eight birds were released into the wild as



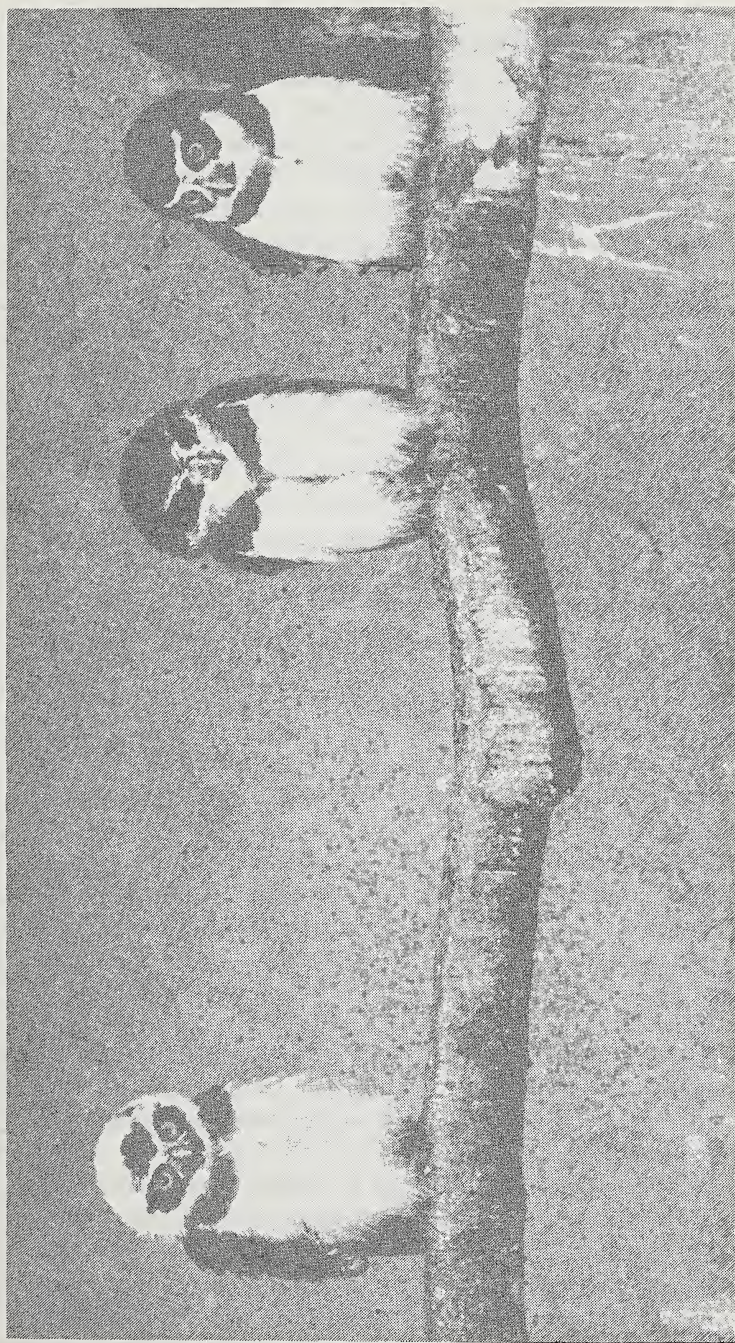
Kenneth W. Green
Sarus Cranes displaying at Chester Zoo. A chick was artificially incubated and successfully reared for the first time at Chester Zoo in 1986

was the ninth chick. This latter bird was paired with one bred by Malcolm Ingham at Thurston and the two released together on the Wirral. We hope that this co-ordinated breeding and release scheme may be successful in establishing more pairs of this beautiful owl in Cheshire. All birds were rung with British Trust for Ornithology rings before release so that their subsequent fates may be followed.

The most exotic of our owls are the Spectacled Owls *Pulsatrix perspicillata*. In 1984 we were thrilled when for the first time at Chester Zoo a young bird was reared by the pair that had previously been considered to be two females. Last year this pair deserted their eggs and a single chick, hatched in the incubator, died within hours of being helped from the egg. This year the 1984 Chester-bred male Spectacled Owl was paired with an older female and these hatched and reared a fine chick. This success was rather soured by the death of that chick's grandmother in September - returning us to the cliff-edge situation of again having only a single breeding female.

The Lesser Vasa Parrots *Coracopsis nigra nigra*, which reared two young in 1985, went through all the motions of courtship and mating, and one pair even laid, but no chicks were reared. Although we believe that our previous success may have been related to social stimulation within the original group of six birds, we suspect that the balance has now changed; either because of a second pair entering breeding condition or because of leaving last year's two young in the colony. One of the adult females had to be removed from the colony because of being harassed by other birds. This bird has now been re-integrated into the group and the two 1985 young removed. If this re-establishment of the original group composition fails then we may have to house the breeding pair separately.

The Blue-eyed Cockatoos *Cacatua ophthalmica* foiled our attempts to remove their first clutch of eggs. These disappeared before we could take them. The second clutch was removed and one chick was hatched and hand-reared. The third clutch was left to the parents but sadly no chicks were hatched by them. In 1984 the Yellow-billed Amazons *Amazona collaria*, on loan from a private aviculturist, hatched but failed to rear a single chick and this was repeated in their two clutches of 1985. It was resolved, therefore, to remove the eggs for incubation and hand-rearing in 1986. This resulted in two chicks being successfully reared from their first clutch at Chester Zoo. The Lilacine Amazons *A. autumnalis lilacina* have still, after four years at the Zoo, shown no interest in their nesting boxes nor any signs of social interaction. We suspect that this may result from wild-caught parents taking a longer time to settle when brought into captivity.



John King

Spectacled Owls with chick reared at Chester Zoo

Parent-reared psittacines included a female Red-sided Eclectus Parrot *Eclectus roratus*, 10 Maroon-tailed Conures *Pyrrhura melanura* - in two broods from one pair - and 11 Patagonian Conures *Cyanoliseus patagonus*. The Patagonian Conures are kept in a colony system and the offspring were from four different pairs. Given that these Conures are not colour-rung, it is not easy to monitor all aspects of their behaviour. However, their keeper noted that whilst only two birds were seen to enter the nest-box, the fledged young appear to be fed by many members of the colony. Could co-operative breeding be a feature of the social organisation in wild Patagonian Conures? It is interesting to note that the first recorded observation of 'helpers at the nest', that is birds other than parents feeding young, in Spree Starlings *Spreo superbus* was reported by Alfred Ezra in the *Avicultural Magazine* of 1924 following his observations on captive birds. Some 50 years later this was documented in the wild by Tom Huels who studied the social behaviour and breeding biology of this species in Kenya. Perversely we have not observed first-brood Spreos attempting to feed second-brood young in the nest. Indeed, one worry has been that our lack of consistency in rearing these birds may be related to young from early broods still demanding food from their parents when these are provisioning later nests. More research is needed on this topic.

A recurrent problem with breeding Starlings and Corvids in captivity is the susceptibility, particularly of young birds, to Gapeworm *Syngamus trachea*. This parasite is common in wild birds especially Starlings (over 30% of adult and 55% of nestling wild Common Starlings *Sturnus vulgaris* are infected). Infection can occur directly from Gapeworm eggs (either from the faeces of infected birds in the aviary or from those of wild birds) or indirectly by the birds consuming earthworms or other invertebrates which act as secondary hosts. Despite regular disinfection of the aviaries and worming of the adult birds, we have only partly controlled the problem. Young birds whilst still in the nest have been treated by presenting the worming agent (we use Panacur) injected into mealworms. The parents carry these to the young but this method cannot guarantee that all young receive the correct dosage. Where possible it is preferable to treat the nestlings direct, removing these from the nest for oral administration of the drug.

This year we were more successful in rearing tropical starlings and mynahs in indoor aviaries (where *Syngamus* can be more effectively controlled and reinfection is much less likely) than in outdoor enclosures. Rothschild's Mynahs *Leucopsar rothschildi* were reared by two different pairs. In both pairs the female parents were obtained through a dealer from Belgium and it is believed that they were themselves hand-reared. This does not appear to have affected their ability to rear their

own young.

Long-tailed Glossy Starlings *Lamprotornis caudatus* and Purple Glossy Starlings *L. purpureus* reared young in the large free flight area of the Tropical House. Other species successfully rearing chicks in the free flight of the Tropical House included Red-cowled Cardinals *Paroria dominicana*, Red-backed Mousebirds *Colius castanotus* and Java Sparrows *Padda oryzivora*. The Fairy Bluebirds *Irena puella* nested and hatched a chick in a very public area of the Tropical House. Both the female parent and the chick disappeared before the latter fledged. The Blue-grey Tanagers *Thraupis episcopus* nested inside one of the Oropendola *Psarocolius wagleri* nests hanging from the palm trees and successfully fledged a single chick. However, this chick emerged from the nest very early and sadly failed to survive to independence.

Our experiences with Fire-tufted Barbets *Psilopogon pyrolophus* and Crimson-rumped Toucanets *Aulacorhynchus haematopygus* indicate constant observation must be maintained on the breeding pairs as aggression between them is not uncommon. Ideally two aviaries are needed for each breeding pair to permit separation of male and female when necessary. This year the Toucanets reared a chick from the first clutch with no problems. This was removed after fledging, allowing the parents to start a second clutch from which two chicks hatched. Shortly after these hatched the female was found dead, circumstances indicating that she may have been killed by the previously unproblematic male. This male then reared the two chicks unaided. Similarly after we suddenly lost our breeding female Fire-tufted Barbet the male continued to rear the chicks unaided. Without knowledge of the social organisation and reproductive behaviour of these species in the wild, it is difficult to decide whether this aggression between the pair is normal or aberrant. Whatever it may be, it is clear that the breeding of these species requires far more in terms of observation and careful husbandry than many other birds.

Kookaburras, kingfishers, rollers, hoopoes, motmots, bee-eaters and hornbills are all included in the order Coraciformes. All are exciting birds in terms of colour, size, ornamentation or behaviour and as such are very popular zoo birds. We recently obtained two captive-bred Blue-crowned Motmots *Momotus momota* from Kilverstone and these have now established themselves in the free flight of the Tropical House. Also two Wrinkled Hornbills *Aceros corrugatus* are new to the collection, having been placed at Chester on deposit by H.M. Customs and Excise. Hornbills are now well represented at Chester. The female Great Indian Hornbill *Buceros bicornis*, which laid for the first time in 1985, is now without a mate but we hold pairs of Grey Hornbill *Tockus nasutus*, Red-billed Hornbill *T. erythrorhynchus* and Trumpeter Hornbill

Bycanistes buccinator. The Grey Hornbills and the Red-billed Hornbills both showed great interest in breeding, going as far as to start mudding around the entrances of their nest-boxes.

The Kookaburras *Dacelo novaeguineae* were exceptionally prolific this year with one pair rearing two broods each of three chicks and a second pair rearing a single brood, also of three young. Although the first of these pairs reared chicks last year, when incidentally both parents were only two years old, this was the first successful breeding attempt for the second and older pair which were received as juveniles from Taronga Zoo in February 1981.

The breeding pairs of Crowned Plovers *Vanellus coronatus* and Blacksmith's Plovers *V. armatus* repeated last year's performances in laying multiple clutches of eggs over the year. Early clutches were removed for artificial incubation and rearing and later ones left for the parent Plovers to hatch and rear. Eight Crowned Plovers and seven Blacksmith's Plovers were reared to independence. However, we have still been unable to establish second pairs of either species.

Sacred Ibis *Threskiornis aethiopica*, Straw-necked Ibis *Threskiornis spinicollis*, Little Egret *Egretta garzetta* and Night Herons *Nycticorax nycticorax* all nested. However, although both species of ibis hatched chicks this year, only the Night Herons were successful in rearing their young. The young Night Heron reared this year has recently been sent, along with our group of Straw-necked Ibis, to Thrigby Hall Wildlife Gardens. These moves were necessary in order to accommodate the endangered Waldrapp Ibis *Geronticus eremita* which have recently been received at Chester.

Our Humboldt's Penguins *Pheniscus humboldti*, although quite prolific in terms of egg-laying have not been very successful in rearing their own young. In 1985 only one chick was reared and so we decided to either remove eggs shortly before they hatched or remove recently hatched chicks for hand-rearing. The first clutch of two eggs was removed a few days before hatching. One chick was hatched in the incubator but the other failed to hatch. Subsequently all eggs were left to hatch under the parents and then the chicks removed for hand-rearing. The first clutch of two eggs was removed a few days before hatching. One chick was hatched in the incubator but the other failed to hatch. Subsequently all eggs were left to hatch under the parents then the chicks removed after hatching. A total of 17 chicks was hatched of which 16 were reared to independence. Two of these later died but we consider that 14 surviving young more than justifies the extra time and work involved in hand-rearing.

Although we may never repeat the remarkable rearing of 11 Ostriches *Struthio camelus* in that dry, hot summer of 1984, we were pleased to

rear two strong chicks to independence. Both are now at Haigh Hall Country Park, Wigan, from where we were grateful to receive five Emu *Dromaius novaehollandiae* eggs. Two of these eggs hatched at Chester and both chicks were successfully reared.

Two Rheas *Rhea americana* and a dozen Chilean Tinamous *Nothoprocata perdicaria* were also bred.

The artificial incubation and rearing of a Sarus Crane *Grus antigone* was, we believe, a first at Chester. The two male Red-crowned Cranes *Grus japonensis* received from Rotterdam Zoo in 1984 still await mates. The Demoiselle Crane *Anthropoides virgo* has now been paired and the West African Crowned Cranes *Balearica pavonina* appear well settled in their new enclosure.

A pair of White-eared Pheasants *Crossoptilon crossoptilon* belonging to Jersey Zoo had been held at Chester since 1980 but over the years 1981 to 1985 only infertile eggs were produced. Last year we were able to exchange males with Jersey and this year for the first time had fertile eggs from which three chicks hatched and one was reared. That bird, a strong young male, is expected to be sent to Antwerp Zoo in the spring. Three Grey Peacock Pheasants *Polyplectron bicalcaratum* were reared but our only remaining female Palawan Peacock Pheasant *Polyplectron emphanum*, hatched at Chester in 1984, may still not be old enough to breed.

The Black Swans *Cygnus atratus* had another good year and two of the six cygnets reared have been given to Paignton Zoo. From this pair, received from the Wildfowl Trust at Slimbridge in 1978, a total of 26 young Black Swans have been reared and sent to other collections. The newly-acquired Hawaiian Geese *Branta sandvicensis* and Red-breasted Geese *B. ruficollis* both laid for the first time this year. The Hawaiian Geese were left to sit their own eggs but failed to hatch any young. The Red-breasted Goose eggs were removed for artificial incubation and four goslings reared. Other waterfowl reared included four Fulvous Tree Ducks *Dendrocygna bicolor*, six Laysan Teal *Anas platyrhynchos laysanensis*, three Chiloe Wigeon *Anas sibilatrix*, five Carolina Ducks *Aix sponsa* and 24 Mandarin Ducks *Aix galericulata*.

Over the year a total of over 240 birds of 49 species were reared. This exceeded both last year's figures and our expectations and reflected the hard work once again put in by our Bird Keeping Staff and the members of the Animal Breeding Centre.

THE FEEDING AND BREEDING OF THREE SOUTHERN AFRICAN SERINS IN CAPTIVITY AND IN THE WILD PART III

By NEVILLE BRICKELL
(Avicultural Research Unit, South Africa)

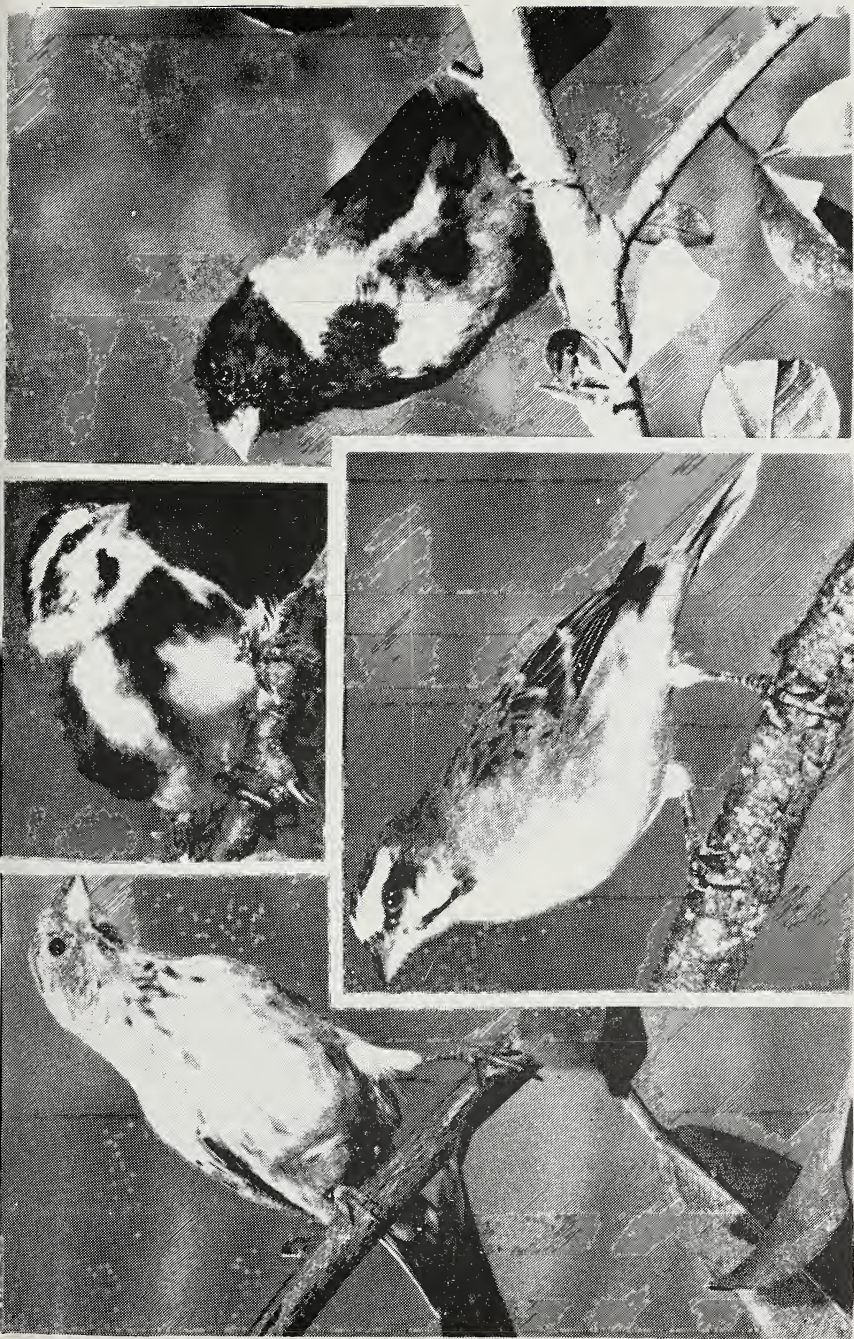
Part II of this series (Brickell, 1987) related to data on the Cape Canary *Serinus canicollis*, Black-eared Canary *S. mennelli* and Streaky-headed Canary *S. gularis*.

The Black-throated Canary *S. atrogularis* is also known as the Peach Canary, Yellow-rumped Seedeater and Yellow-rumped Serin. During the breeding season it constructs a compact cup of dry grass and fine twigs bound with cobwebs. The lining may consist of plant down, cotton, animal hair, wool and feathers. The nest is situated at 1.2-1.5m above ground in a vertical fork of a tree, often in conifers, in dry cones of protea bushes, at the base of palm fronds or in a notch of a tree trunk. There is also a record of it nesting on the rafter of an outbuilding.

It breeds in all months in the Transvaal Province of South Africa and from November to January in Zimbabwe. Two to four eggs are laid. They are white or pale bluish green, plain or sparingly spotted with brown, purple and black, chiefly at the large end. Egg measurements average (22) 16.7 x 12.4 (15.5-18 x 11.4-13.2). Incubation is by the female, and lasts 12-13 days. The nestling period is 15-18 days and the young are fed by both parents, but the male plays a greater part for some considerable time. The young are independent at 6-7 weeks.

The Yellow-eyed Canary *S. mozambicus* is more commonly known outside Africa as the Green Singing Finch, Yellow-fronted Canary, Icterine Canary and Mozambique Serin. When nesting, it builds a shallow compact cup of fine twigs and other vegetation, bound with cobwebs. The lining may consist of seeding grass heads, plant fibres, animal hair and the occasional feather. Nests are usually built in horizontal forks of trees, bushes or creepers at 1-6 m above ground.

It breeds from October to April in the Transvaal Province of South Africa, and from September to May in Zimbabwe. Two to four eggs are laid and are white or pale blue, plain or sparsely spotted with pink, reddish brown and black, chiefly at the large end. Egg measurements average (86) 16.3 x 12.1 (14.6-18.5 x 11.1-13.8). Incubation is by the female alone and takes 13-14 days; the nestling period is 16-25 days. The male feeds the fledglings for some time afterwards but they are indepen-



Neville Brickell

(left) Black-throated Canary *Serinus atrogularis*; (centre above) Damara Black-headed Canary *S. a. leucolaema*;
(centre below) Yellow-eyed Canary *S. mozambicus*; (right) Black-headed Canary *S. alario*

dent at 9-10 weeks.

The Black-headed Canary *S. alario alario*, from North and Central Cape Province, is also known as the Mountain Canary, Alario Finch and Blackhead. The subspecies *S.a. leucolaema*, from Namibia, Botswana and West Cape Province, is known as the Damara Black-headed Canary and King Black-headed Canary.

At the start of the breeding season (July to April in South Africa), it constructs a deep cup nest of dry grass and fine twigs with a lining of wool or similar soft material. The nest may be situated 30-100 cm above the ground in a bush or small tree. Two to four eggs are laid which are white or bluish green, blotched and streaked with brown, chiefly at the large end. Egg measurements average (38) 16.5 x 12.4 (15-18.2 x 11.5-13.3). Incubation is by the female and lasts for 13-14 days; nestling period is 20-22 days.

The Black-throated Canary feeds on grass and weed seeds, buds, berries and insects. It has been recorded feeding on the seeds of:

Annual Signal Grass *Urochloa panicoides*

Wild Sunflower *Helianthus annuus*

the buds and petals of:

Blue Lupin *Lupinus angustifolius*

In captivity will take the seeds of:

Khaki Weed *Alternanthera pungens*

Guinea Grass *Panicum maximum*

Blue Panic *P. laevifolium*

Bushveld Signal Grass *Urochloa mosambicensis*

Annual Signal Grass *U. panicoides*

Small Canary Grass *Phalaris minor*

unripe seedheads of:

Blackjack *Bidens pilosa*

the buds, petals or leaves of

Milk Thistle *Sonchus oleraceus*

Canary Creeper *Senecio tamoides*

Parrot Leaf *Alternanthera ficoidea*

Smeltersbossie *Flaveria bidentis*

the berries of:

African Mulberry *Morus mesozygia*

Inkberry (tree) *Cestrum laevigatum*

and small mealworms, termites and spiders.

The Yellow-eyed Canary has been recorded feeding on the seeds of:

Eucalyptus *Eucalyptus* spp.

Wild Sunflower *Helianthus annuus*

Guinea Grass *Panicum maximum*

Beefwood Tree *Casuarina equisetifolia*
 petals of Red-hot Poker *Kniphofia*, leaves of Chinese Hibiscus *Hibiscus rosa-sinensis* and soft achenes of small *Composites* such as *Ursinia* and *Veronia*, probing nectar at the base of the flower tubes of:

Flat-flowered Aloe	<i>Aloe marlothii</i>
Candelabra Aloe	<i>A. candelabrum</i>
Krantz Aloe	<i>A. arborescens</i>

fruit of Dull-leaved Mukwakwa *Strychnos innocua* and live food in the form of aphids, beetles, termites and hairless caterpillars. Aviary birds will take readily to the seeds of:

Khaki Weed	<i>Alternanthera pungens</i>
Canary Seed Grass	<i>Lepidium africanum</i>
Bird Grass	<i>Poa trivialis</i>
Guinea Grass	<i>Panicum maximum</i>
Blue Panic	<i>P. laevifolium</i>

the buds, petals or leaves of:

Canary Creeper	<i>Senecio tamoides</i>
Parrot Leaf	<i>Alternanthera ficoidea</i>
Smeltersbossie	<i>Flaveria bidentis</i>

The Black-headed Canary is recorded as feeding on seeds, and in captivity will take the seeds of:

Khaki Weed	<i>Alternanthera pungens</i>
Guinea Grass	<i>Panicum maximum</i>
Blue Panic	<i>P. laevifolium</i>

and the unripe seeds of the Blackjack *Bidens pilosa*, the buds, petals or leaves of the Canary Creeper *Senecio tamoides* and Smeltersbossie *Flaveria bidentis*, the berries of African Mulberry *Morus mesozygia* and live food in the form of termites.

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BIRDS OF PREY AT TIERPARK BERLIN, DDR

By ALAN PRINGLE (Cobham)

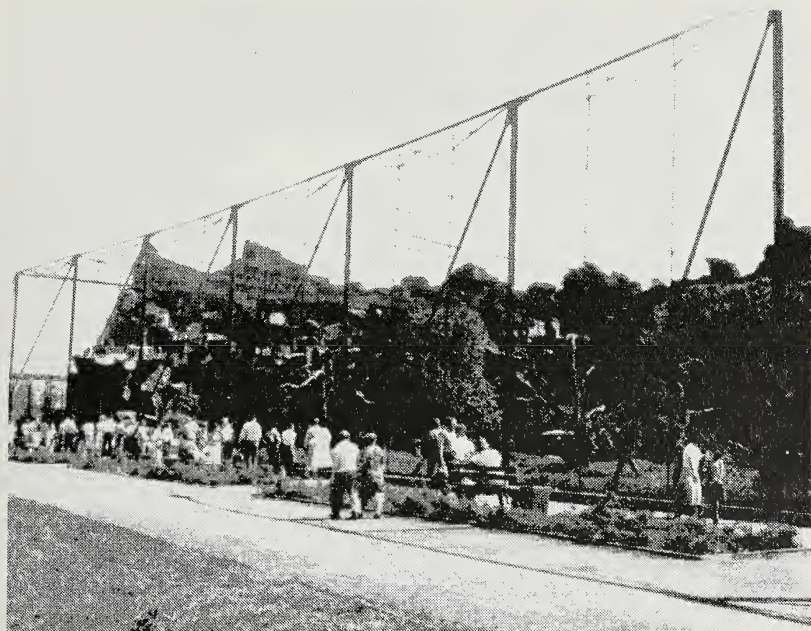
Since the division of Berlin in 1961 two very different zoological collections have grown and developed in the respective halves of the city. While the older, original Zoological Garden, founded in 1841 in what is now West Berlin, has built up one of the finest collections of animals in the world (including an impressive display of birds), the younger and larger Tierpark in East Berlin, founded 1954, has tended toward more specialised groups, namely ungulates, waterfowl and birds of prey.

During a short visit in May of this year, I was fortunate enough to be shown around the Tierpark by Dr. Dieter Minneman, Curator of Birds of Prey and Owls. As the bulk of their collection is not on show to the public, his hospitality and help was invaluable.

The Tierpark is vast, over 300 acres, and the raptor collection has spread throughout the grounds as it has developed. Most of the on-show aviaries are small, basic affairs with the exception of a huge mixed species exhibit built on to the back of the Alfred Brehm House for cats and birds. This aviary, measuring approximately 140 ft long, 60 ft deep and 30 feet high (42.67m x 18.28 x 9.14 m), houses over 15 species of diurnal raptor. The back and one side of the aviary interior simulates a sheer cliff face overlooking a rough terrain of small trees, stumps, bushes and small ponds. Red Kites *Milvus milvus* and Black Kites *M. migrans* wheeled and circled over less energetic groups of King Vulture *Sarcorampus papa* and American Black Vulture *Coragyps atratus*.

Old World Vultures, however, were the most numerous inhabitants of this aviary and included well-known species such as Lappet-faced *Torgos tracheliotus*, Egyptian *Neophron percnopterus* and no less than five species of Griffon Vulture (*Gyps fulvus*, *G. indicus*, *G. rueppelii*, *G. himalayensis* and *G. coprotheres*)! Numerous crevices and ledges had encouraged many species to breed. Risk of inter-specific nest predation has been reduced by removing the eggs for artificial incubation only to be returned to the parents at the pipping stage (the adults having meanwhile innocently incubated wooden eggs!).

Elsewhere in the Tierpark one could see the famous breeding pair of Harpy Eagles *Harpia harpyja* who produced the world's first captive-bred chick in 1981. Other successful 'world firsts' of which the Tierpark is justifiably proud include European Black Vulture *Aegypius monachus* and Wedge-tailed Eagle *Aquila audax*. Their Secretary Birds *Sagittarius serpentarius* bred for the first time in 1983 but Vogelpark Walsrode had claimed



Alan Pringle
Mixed species aviary at Tierpark Berlin (top) with identification labels panel (below)

the honour two years earlier.

Small owl aviaries around the Tierpark display an interesting selection to the public including Spectacled Owls *Pulsatrix perspicillata*, Boobooks *Ninox novaeseelandiae* and Tengmalm's Owls *Aegolius funereus*. As with diurnal raptors, however, the main owl collection was off-show, and included Oriental Bay Owls *Phodilus badius*, Ferruginous Pygmy Owls *Glaucidium brasilianum*, Great Grey Owls *Strix nebulosa* and Burrowing Owls *Speotyto cunicularia*. Some young Milky Eagle Owls *Bubo lacteus* were temporarily occupying one aviary in a new private block which will eventually house the Tierpark's Sea Eagle collection. These are something of a speciality within a speciality and include several breeding pairs of White-tailed Sea Eagles *Haliaeetus albicilla*, White-bellied Sea Eagle *H. leucogaster*, Pallas's Sea Eagle *H. leucoryphus* and African Fish Eagle *H. vocifer*. Scientists from the Tierpark are currently in Madagascar studying the highly endangered Madagascar Sea Eagle *H. vociferoides* in the wild and assessing the feasibility of bringing some into captivity. At another off-show area, the two most famous Sea Eagles could be seen, the Bald Eagle *H. leucocephalus* and the mighty Steller's Sea Eagle *H. pelagicus*. The latter are quite magnificent birds of huge, solid stature with striking black and white plumage and the largest beak of any bird of prey. Sizewise these are regarded as the largest raptor although female Harpy Eagles are heavier. Until recently the Tierpark had only two Steller's Sea Eagles, both males, but their continued courtship and nesting activity prompted the staff to try them with a Wedge-tailed Eagle egg out of curiosity. To everyone's astonishment the 'pair' hatched and reared the young Wedge-tailed Eagle! Now, fortunately, a young female has been acquired so hopefully it will not be long before another 'first' is achieved. An interesting observation made here on the Sea Eagles is the absence of cainism (where the eldest chick kills its younger, weaker brethren) in the species from temperate climates while it is a common phenomenon in those from more tropical areas. As one would expect, cainism in areas of difficult fishing and limited supply, it seems odd that it occurs only in those species which hunt the rich, well-stocked rivers and mangrove swamps of Africa and Southeast Asia.

Modern technology plays a big role in raptor production at the Tierpark as Dr. Minnemann showed us when we reached the main operation's laboratory in the Park. Here closed-circuit television cameras record birds on the nest and microphones listen in on hatching chicks. Electronic eggs are used to measure the fluctuating temperatures in the nests under brooding birds. Many research students work on their thesis projects at the



Alan Pringle
Tierpark Berlin: (top) male Steller's Sea Eagle; (below) Milky Eagle Owl

Tierpark and during our visit one girl was studying a nest-ing pair of Turkey Vultures *Cathartes aura*. Birds already being returned to the wild from the Tierpark include Barn Owls *Tyto alba*, Tawny Owls *Strix aluco*, White-tailed Sea Eagles *Haliaeetus albicilla* and several Ospreys *Pandion haliaetus*, the latter mostly being accident victims which are brought to the parks for treatment and eventual release.

Few falcons appeared to be kept at the park but smaller birds of prey are still well represented and include Red-thighed Falconets *Microhierax caerulescens*, White-eyed Buzzards *Butastur teesa*, Long-legged Buzzards *Buteo rufinus* and Red-tailed Hawks *B. jamaicensis*. By far the best represented group, however, is the eagle collection with such rarities on show as Ornate Hawk Eagles *Spizaetus ornatus*, Imperial Eagles *Aquila heliaca*, Wahlberg's Eagle *A. wahlbergi* and a solitary Martial Eagle *Polemaetus bellicosus* for which Dr. Minnemann hopes to find a mate as soon as possible. Grey Eagle Buzzards *Geranoaetus melanoleucus*, a rarely seen species from South America and a large breeding group of Striated Caracaras *Phalcoboenus australis* completed the highlights.

Common Buzzards *Buteo buteo* and Tawny Eagles *Aquila rapax* are often used to great success as foster parents to other birds' eggs. This often ensures safe hatching of rarer species under tried and trusted older birds while the true parents are free to lay again, make their mistakes and gain their experience with a second, or even third clutch.

In total over 70 diurnal raptor species and 35 owl species are kept at the Tierpark of which 50% are breeding. Dr. Minnemann aims to breed *at least* one new species each year and so far, over the past 20 years or so, he has maintained that ambition. He attributes his success to simple, yet vital factors such as proper pairing through observation by vigilant staff, feeding of only freshly killed feed animals which, in turn, have been fed only fresh grass in the week before they are fed to the birds, and seclusion during the breeding season. He stressed the importance of inter-collection co-operation and could not impress upon me enough his willingness to exchange stock with anyone who cares to contact him.

In short, Tierpark Berlin must have one of, if not *the* best bird of prey collections in the world and anyone interested in the captive maintenance of these birds is well advised to visit it. The staff are very helpful and friendly and, provided advance warning is given, only too happy to show people around 'behind the scenes', which is where the *real* collection is.

A FLEETING GLIMPSE AT BIRDKEEPING IN MALTA

By JEFFERY BOSWALL
(Bristol)

During seven days on the main Maltese island, 28th December 1986 to 4th January 1987, I visited three shops that sell cage birds, the home of one fancier, and read about finch-trapping in the excellent ornithological book *A New Guide to the Birds of Malta* by Joe Sultana and Charles Gauci, published by the Malta Ornithological Society. What follows is not only uncomprehensive, it is probably unrepresentative to the point of being fragmentary. Anyway what follows is at least factual!

The most interesting shop was in Hamrun and it was the only one to sell only birds. The man there was a trapper as well as a seller of birds. Some birds were wild-caught by him in Malta (e.g. the Chaffinches *Fringilla coelebs*), but the two unidentified tropical starlings (Sturnidae) were no doubt wild-caught abroad and then imported. The Budgerigars *Melopsittacus undulatus*, Zebra Finches *Poephila guttata* and Canaries *Serinus canaria* all displayed the individual variety of plumage associated with domestication, while the Java Sparrows *Padda oryzivora* and one Pekin Robin *Leiothrix lutea* were most likely also born in an aviary.

In Malta all wild birds are protected by law except that 21 species or groups may be shot and 15 trapped and sold. Of these last the shop in Hamrun was offering for sale Hawfinch *Coccothraustes coccothraustes*, Goldfinch *Carduelis carduelis*, Greenfinch *C. chloris*, Chaffinch, Siskin *C. spinus*, Serin *Serinus serinus*, Linnet *Carduelis cannabina*, Song Thrush *Turdus philomelos* and Quail *Coturnix coturnix* (the last is a delicacy, the rest are cage birds, of course). In addition, the following species were on offer apparently against the law: Brambling *Fringilla montifringilla*, Hedge Sparrow *Prunella modularis*, Short-toed Lark *Calandrella brachydactyla* and European Robin *Erithacus rubecula*.

The numbers of each species held in the shop on 30th December 1986 with, in some case, the price in Maltese lire (usually referred to as Maltese pounds) are given below. The exchange rate on 27th December was £1.91 sterling to the Maltese pound. Thus a Pekin Robin that sells for £M2.00 would, in effect, cost £3.82, say £4.00.

No.	%	Species	£M each
2	1.0	Starling sp.	
21	10.5	Budgerigar	0.75

34	17.0	Zebra Finch	
55	27.5	Canary	2.50- 5.50
5	2.5	Java Sparrow	
1	0.5	Pekin Robin	2.00
1	0.5	Hawfinch	15.00
1	0.5	Goldfinch	
7	3.5	Greenfinch	
45	22.5	Chaffinch	2.00
1	0.5	Siskin	
3	1.5	Serin	
9	4.5	Linnet	
1	0.5	Song Thrush	1.50
2	1.0	Quail	4.00
1	0.5	Brambling	
1	0.5	Hedge Sparrow	
2	1.0	Short-toed Lark	2.00
8	4.0	European Robin	0.75
200	100.0	TOTAL	

It will be seen that 59.0% of the individuals for sale are foreign cage birds, nearly half of them Canaries. The balance, 41.0%, is of European birds, all apparently caught wild on the island. Of these over half are Chaffinches.

As regards price, the Canaries vary according to the breed, from £M2.50 to £M5.50. Budgerigars are inexpensive at 75 cents each. The Hawfinch is costly at £M15.00 because it is an uncertain migrant, whereas the regular Chaffinch is only £M2.00. Robins are less popular than finches, perhaps because they are softbills and thus more difficult to feed, and sell for 75 cents apiece.

Some of the birds were kept in distressingly small cages. A Chaffinch, itself 15 cm long, or a Greenfinch, 14.5 cm long, may be kept in a cage only 18 cm long, 12.5 cm wide and 11.7 cm high; a Robin, 14 cm long, in a cage 20.00 cm x 12.5 cm x 14.3 cm, and a Hawfinch, 17.5 cm long, in a cage 19.3 cm x 13.0 cm x 13.0 cm. None of these birds could easily or fully stretch their wings.

The only public display of birds I came across was in St. Anton Botanical Gardens, at Balzon. This was limited to the following in large aviaries: 2 Crowned Cranes *Balearica pavonina* (the grey-necked species), 2 Blue Peafowl *Pavo cristatus*, scores of Budgerigars, one Griffon Vulture

Gyps fulvus and 10 Chinese Ring-necked Pheasants *Phasianus colchicus*. On a small ornamental pond were 10 Mallard *Anas platyrhynchos*, two Black-necked Swans *Cygnus melanocoryphus*, two Black Swans *C. atratus* and a Coot *Fulica atra*.

* * *

GROSBEAK STARLINGS

Scissirostrum dubium

By ERIC CLEWLOW

(Natal, Republic of South Africa)

In 1985 I imported a shipment of birds from Belgium and among them were four starlings which according to the supplier were *Aplonis mysolensis*. With no illustrated reference to confirm this, these birds were described locally as Moluccan Starlings (Walters, *Birds of the World*). The four birds were left together and on two occasions eggs were found in the nest-box they had decided upon. Two eggs, light blue and speckled, were laid on each occasion.

When I received Vol. 91, No. 3, of the *Avicultural Magazine* and saw the article and photograph relating to the breeding of Grosbeak Starlings by Bryan Peck I immediately saw that my 'Moluccan Starlings' were *Scissitorstrum dubium* and upon reference again to Walters, found them described as Scissorbill Starling. However, the important point is that the birds had been moved from my large garden away into a breeding aviary 2 m high, 1 m wide and 4 m long. The birds were quite happy but very shy. Upon entering the aviary the four birds would immediately enter a nest or two. After a few months I decided to move them back to the large planted aviary where it was more convenient for me to watch them. When I did this I also put back into the large aviary, the nest-box which they appeared to favour most whilst in the smaller aviary. This was nothing more than a budgerigar nest-box with the loose concave panel removed.

Like Mr. Peck, I left the nest alone and did not attempt to start the nest or supply any particular material. Being in the large planted aviary, they had a choice of the normal grasses supplied and, of course, could find loose feathers, etc., lying around. The nest built was very sparse and

coarse wide grass was used with very few feathers but, as with Mr. Peck's birds, the nest was a loose affair with not the faintest hint of a cup. Two eggs were duly laid and around the nest-box was declared a 'No-Go' area! On 15th December 1986 I could resist the temptation no longer and upon looking into the nest-box, two beautiful chicks were observed. This was the first and last time that the nest-box was approached directly and the two young left the nest on 18th January 1987. They were duller and smaller editions of the parent birds. One of the young was very strong on the wing compared to the other. The weakest spent a day or two at low altitude but the parents were most attentive and were always close by.

The diet which is supplied to all the softbills generally consists of: soaked dog biscuit, assorted fruits, a rearing food mixed with hard-boiled egg, carrot, Brewers Yeast and CLO. The basic rearing food is one manufactured and supplied by Kameeldrift Bird Farm in Pretoria. As there are a number of seedeaters in the aviary as well, I also supply a dish of soaked seed daily. Live food initially was restricted to live ants and the occasional mealworms. As I noticed that the starlings appeared to get left behind when the mealworms were supplied, I became rather worried and on one occasion my son and two granddaughters spent the morning looking for garden insects to keep them going. However, when these were put in the aviary, the Chorister Robin, Cape Robin and Amethyst Starlings got in first and that was that. Sitting at the breakfast table one morning our servant came to me with a packet she said she had found in our spare deep freeze. With a quizzical look I gazed into the packet only to see a quantity of 'flying ants' which, having been caught by my family earlier in the year, I had separated into smaller plastic bags and put into the deep freeze for a rainy day! Well, the rainy day had arrived and I needed some additional food for the Starlings badly. I had never used deep frozen flying ants before so, taking a small quantity (30/40), I left them to thaw out. After about three-quarters of an hour I entered the big aviary with the flying ants on a piece of paper in the palm of my hand. Before I could place them in the dog biscuit dish, a hen Black Sunbird helped herself to one! At this stage I could see that the Starlings had noticed what I was holding and immediately I put the flying ants in the dish, they also came down and I am pleased to say that they ate most of them and then the parents flew to the nest-box and proceeded to feed the young. This was a daily happening when the flying ants were provided. I am pleased to say that my stock of frozen ants lasted until 28th January and I have now gone back to a few mealworms daily.

Both young birds are extremely well and active and it would appear that the parents are getting ready to go to nest again.

NEWS AND VIEWS

The first reported captive breeding of the Freckled Duck *Stictonetta naevosa* has taken place in Australia. The colony maintained by the C.S.I.R.O. at Canberra has been very successful - two females have hatched young, another has incubated and a further three have been reported as egg-laying. A number of young have been reared.

* * *

The status of the Norfolk Island Kakariki is at present only 22 birds, of which two pairs and three odd cocks are maintained in captivity. In an effort to improve the habitat of the wild population, rabbits have been eradicated from Philpp Island, resulting in a rapid re-establishing of natural vegetation. *Australian Aviculture*.

* * *

On a rather depressing note, the Norfolk Island race of the Boobook Owl is down to a single specimen.

* * *

A plane, a Boeing 737, and a fish, make unknown, have collided over Alaska. An hour-long inspection of the aircraft revealed no serious damage; the fish rendered almost uneatable. It had been dropped by an alarmed Bald Eagle as the jet took off from Juneau Airport. 'The law of the jungle prevailed', says the pilot. 'As the larger bird approached, the smaller bird dropped its prey'. *Daily Mail*.

* * *

The breeding biology of the Red-billed Quailfinch *Ortygospiza gambonensis* in Zambia is the subject of an article by E.H. Perry in the December 1986 issue of *Ostrich*, the journal of the South African Ornithological Society. The article contains much information on breeding and is well worth a read by aviculturists planning to breed this species.

* * *

The American Federation of Aviculture's bi-monthly magazine is always a joy to receive. The December/January 1987 issue of *Watchbird* contains many interesting articles amongst which are ones covering the breeding of the Celebes Ground Dove *Gallicolumba tristigmata*, Golden-headed Quetzal or Trogon *Pharomachrus auriceps* and the Guinea Touraco *Tauraco persa*.

* * *

What is the world's most abundant bird species? The combined population of the chicken, in all its forms, is given as 7.3 billion. Of wild species, the distinction probably goes to one of the petrels or shearwaters of the southern seas. Estimated world population for the Sooty Shearwater is given as a thousand million, making it the likeliest contender.

The Oriental Crested Ibis is the subject of a special project by the Brehm Fund for International Bird Conservation. The project aims to provide equipment for research and will bring three Chinese biologists to Germany in 1987 for a training programme in research, conservation and captive propagation of endangered species.

The total world population of this ibis is thought to be 34, of which 29 make up the wild populations in China and the USSR. The five in captivity are in two collections in China and Japan.

Seven young were reared in three active nest sites in Shaanxi Province in China, in 1986.

* * *

A regular contributor to the *Avicultural Magazine* for many years, Jeffery Boswall is leaving the BBC's Natural History Unit in Bristol to take up the position of Consultant Head of Films and Videos for the Royal Society for the Protection of Birds. We would like to wish him every success in his new post and also hope that he will not be so pre-occupied that he has no time to write for us any more! It is very encouraging that someone sympathetic to aviculture now has such an important role in conservation.

* * *

Otorohanga Native Bird Park, New Zealand, has had much success with endemic species. Two such breedings are reported in the pages of *Australia Aviculture* by Martin Fingland and cover the Tui *Prosthemadera novaeseelandiae* and the Weka *Gallirallus australia*. Both articles contain much useful information.

* * *

The breeding of the Bay-headed Tanager *Tangara gyrola* by E. and T. Davison is described in the Summer 1986 issue of *Foreign Birds*. This is believed to be the first reported success for this species in the U.K.

* * *

The breeding of colour mutations is not really something that appeals to me but occasionally the odd one turns up in wild birds and causes interest. Certain finches and psittacines are noted for mutations but, as far as I am aware, kingfishers have until now lacked reports.

Early in 1987 an albino Kookaburra was found in Australia by a passing motorist. The bird, weak and very hungry, was taken to Healsville Sanctuary in Victoria where it has regained its strength. 'Albi', as he was christened, is believed to be three to four months old.

D.C.

We have received a first notice of the XX International Ornithological Congress which will be held from 2-9th December, 1990, in Christchurch, New Zealand. Professor Charles G. Sibley (USA) is President and Dr. Ben D. Bell (New Zealand) is Secretary-General. The anticipated Congress programme will include plenary lectures, symposia, contributed papers (spoken and posters), workshops, discussion groups and films. There will be a mid-Congress excursion day. Pre- and post-Congress excursions are planned to interesting ornithological sites in New Zealand and adjacent regions. Requests for the First Circular and suggestions regarding Congress organisation should be addressed to: Dr. Ben D. Bell, Secretary-General, XX International Ornithological Congress, Department of Zoology, Victoria University of Wellington, Private Bag, Wellington, New Zealand.

* * *

Just received by the Editor is a delightful book, *Encounters Enchanting with Birds*, by Professor Carl Naether, one of our oldest and greatest supporters. It is an enlarged edition of a collection of articles and photographs first published in 1971 and is published by Allen Publishing Company, Salt Lake City, Utah. A retired Professor of English, Carl Naether has had a lifelong interest in birds, particularly pigeons and doves, and still enjoys keeping his collection of birds at his home in the San Fernando Valley, California, photographing them and writing about their behaviour. He has contributed to many publications worldwide, including, of course, the *Avicultural Magazine*. Members all over the world will wish to join in sending to Professor Naether our very best wishes for his continued good health and zest for life.

* * *

Another regular contributor to our journal, especially the 'News and Views' column, is David Coles who has just realised a long-cherished ambition by publishing in book form *First Breeding Records for Birds Reared to Independence under Controlled Conditions in the United Kingdom*. David Coles has been compiling these records for many years and those for some families have been published in the *Avicultural Magazine* and more will continue to be published from time to time. However, here in one volume are some 1400 records of species and subspecies bred for the first time in this country, and giving the name of the breeder, date and reference. It is an invaluable reference work as well as providing hours of enjoyable 'dipping', and highly recommended. Available from the author only at P.O. Box 110, Cobham, Surrey, KT11 1BE, England. Price (including postage and packing): UK £5.50; Europe £6.00, elsewhere £6.50 (payment in sterling).

Ed.

REVIEWS

BIRDS OF NEW GUINEA

By Bruce M. Beehler, Thane K. Pratt and Dale A. Zimmerman. Princeton University. Hardback - ISBN 0-691-08385-1, Price £53 (including postage from Messrs. Wheldon and Wesley); paperback ISBN 0-691-02394-8, £25.20

This book is the first definitive ornithological field guide to New Guinea and will be very well received by all aviculturists whether they are seriously interested in the birds of the region, or merely anxious to fill a gap in the bookshelf. It is the result of an elaborate cooperative project involving experts in Papuan birds in Australia, New Jersey, Los Angeles, New York, New Mexico and New Guinea itself. The three main authors write in the acknowledgements that in a few years the book will require revision because of the continuing discoveries of colleagues working in the field and studying in museums and universities. However there is no doubt that this first edition is a standard work of reference that will be extremely useful for a long time to come.

The first 40 or so pages describe the geography and natural history of New Guinea and its satellite islands. It covers ornithological exploration, ornithogeography and the bird regions of the land for there are some 15 regions of varying size, most of which form distinct zoogeographic units well defined by the presence of endemic bird populations. The section on ecology is particularly interesting, although I must admit to finding the entire part on the natural history totally absorbing.

There is a most helpful chapter entitled 'In the Field', which gives information essential to anyone intending to visit New Guinea for ornithological reasons; from the most suitable binoculars and other equipment, health hazards, permits and etiquette to observe, all the way to suggestions on where and how to look for birds.

New Guinea is the second largest island in the world, a lush biologically-rich land supporting a wide radiation of plant life that in turn supports over 700 species of birds.

It is one of the richest parts of the world in numbers of species, with a typical square kilometre of lowland rainforest supporting around 150 species. In richer areas the list may increase to 165 or 170 resident species. This is poor compared to some parts of the Amazon where up to 350 species may be found, but New Guinea is unusual in supporting large numbers of fruit and nectar-eating birds. Compared to a similar forest community in Peru, New Guinea has twice as many fruit-eaters and nectar-eaters as a proportion of the fauna.

The main text of the book follows normal field guide format, with an introduction for each family then an account of each species listed.

Terminology is a mixture of English (Australian) and American, but I found no cause for complaint nor any personal confusion. The English name is clear and when there are widely used alternatives, these are also given. For example: BARN SWALLOW *Hirundo rustica* (Swallow, Common or European Swallow). Paragraphs under the headings Description, Similar Species, Habits, Voice and Range cover their subjects succinctly and helpfully. More than 600 species are illustrated in 47 colour plates and a further eight black and white halftone plates. They are painted by Dale Zimmerman and James Coe and are well up to the high standard expected of modern field guides in the Peterson tradition.

My personal delight was to find the plate illustrating the 16 species of finch, the first time to my knowledge that those species have all appeared in colour in any publication. Since I am fortunate in owning four of the species of *Lonchura* illustrated, I was able to make very critical comparisons. My only concern was the eye of the Great-billed or Grand Munia *L. grandis* which is shown red - in contrast to the dark brown of the other species. I have five of this species, two males and three females, all of which have brown eyes. It is a very small point, and not one that would result in a mis-identification, nor prevent a warm endorsement for a much-needed addition to the bird books of the Pacific.

R.R.

CORRESPONDENCE

Breeding Fischer's Whydah

Although an account of this first breeding has already been published in another journal (Foreign Bird Association magazine), David Coles felt that Avicultural Society members would be interested in the details recorded briefly below.

My pair of Fischer's Whydahs *Vidua fischeri* were kept in an unplanted, L-shaped aviary which was 18 ft long (3.65 m).

When the cock came into full colour in June 1984 he started hovering and darting around the aviary, singing loudly in flight and around the aviary occupants. The displays, especially towards his mate, increased intensely over a period of about four weeks. He was observed feeding the hen whilst still hovering above her for long periods, sometimes for five minutes or more in the air.

During the third week of August the hen started to visit an unoccupied Zebra Finch nest-box for anything up to 10 minutes at a time. A week later the nest-box was examined and found to contain four white Zebra Finch eggs and two alien eggs, both larger. The two alien eggs were coloured pale blue with reddish markings in the form of lines, not spots.

I was lucky and the Zebra Finch parents hatched both eggs. The chicks were larger than Zebra Finch chicks and very dark in colour (sooty). Unfortunately one chick died at four days old but the other one flourished with its three Zebra Finch nest-mates. The Whydah chick left the nest on 19th September, 1984, at approximately 16 days old. It begged for food just like the Zebra Finch chicks, with its head on one side and crouching. It was fed for approximately three weeks after leaving the nest before it was seen feeding itself. The parent Whydahs showed no interest in nest or chick after laying the two eggs.

When first hatched, the chick had very dark body down. It developed light fawn colouring underneath, and a darker rusty brown on the back, head, etc. It moulted out to a very pale cream underneath and much darker back, with neck to eye having two dark lines appearing giving the form of stripes. At six months it moulted out into a hen bird in more or less adult colours.

The young Whydah was transferred with its parents to a smaller finch aviary for the winter which was easier to protect against bad weather. After approximately four months in winter quarters, the hen Whydah was again observed visiting a Budgerigar-type nest-box (which could not be opened), occupied by a pair of Blue-capped Waxbills. On several occasions the hen Whydah was observed to wait for the hen Blue-capped Waxbill to leave the nest-box (but was seen twice with the Blue-capped cock in the nest-box).

I believe the hen Whydah laid her eggs between 17th and 23rd March (1985) because after this period she was not seen near the Blue-capped Waxbill nest. On 20th April 1985 two young were observed together with three Blue-capped Waxbill chicks, being fed by the latter's parents.

This time the young Whydahs did not beg to be fed, as on the previous occasion with Zebra Finch parents, nor did they crouch or put their heads to one side, so perhaps chicks' behaviour varies according to their foster parents. Both young were reared to maturity. They were much darker than the first young reared (hen) and so perhaps can be sexed before moulting. They both turned out to be cocks - I was unsure at first because they were almost black for nearly six months, then started to show buff marking on the cap and belly.

Three young Fischer's Whydahs were reared to maturity during the period August 1984 to April 1985, from two broods, one fostered by Zebra Finches and one by Blue-capped Waxbills.

25 Perran Avenue
Whitwick,
Coalville,
Leicestershire LE6 3PQ.

A.J. Lee

* * *

The Lemon-breasted Canary

At last the official version of the Lemon-breasted Canary saga has been brought to the forefront (Vol. 91, No. 3) and this does indeed clarify the position leaving no doubt now as to who initially discovered the bird. I am, however, very distressed to learn that although Messrs. Clancy and Lawson acknowledged this fact in 1960, the species was not named after Jack Scheepers - surely an injustice! I would think that it is up to our national and provincial cage bird and avicultural bodies to take the matter up and see that Mr. Scheepers' name is justly recorded for all to see. Perhaps this is something our fellow member, Neville Brickell, should pursue vigourously?

P.O. Box 28071
Malvern 4055, Natal, South Africa.

Eric Clewlow

The Editor does not accept responsibility for opinions expressed in
articles, notes, reviews or correspondence

AVICULTURAL SOCIETY ANNOUNCEMENTS

At its meeting on 11th April 1987, the Council approved the following awards for the first breeding of a species in Great Britain and Northern Ireland, no prior claims having been recorded:

The Society's Medal

Mr. Alan Griffiths for breeding the Pale-headed Mannikin *Lonchura pallida* in 1986.

The Society's Certificate of Merit

Paignton Zoo for breeding the Little Black Bustard *Eupodotis afra* in 1984, and the Brown Fish Owl *Ketupa zeylonensis* in 1985.

Chester Zoo for breeding the Lesser Vasa or Black Parrot *Coracopsis nigra* in 1985.

* * *

VISIT TO BIRDWORLD, FARNHAM

Members spent a very enjoyable day on 11th April 1987 at Birdworld, Farnham, by kind invitation of Mr. and Mrs. Roy Harvey. After a very good lunch provided by our hosts, Mr. Robert Harvey gave a short talk on the history of Birdworld and then took members on a guided tour. There was a great deal to see and admire in the beautifully landscaped gardens and it is quite remarkable how much this enthusiastic family enterprise has achieved in so few years. After being revived by welcome tea, members made their way home by way of the excellent gift shops where the merchandise is of a very high standard, great care having been taken in the choice of stock and the presentation.

We would like to thank our hosts and the entire Harvey family for giving us such a pleasant and interesting day.

FUTURE EVENTS: Tentative dates have been arranged for the following: Lunch and lecture meeting at Warren Hill, Hartley Wintney, on 11th July; garden party at Chestnut Lodge, Cobham, on 6th September, and a dinner to be arranged in late October/early November. Further details of all these events will be inserted in the Magazine if there is time, or sent individually to members who have asked to be on the meetings mailing list.

* * *

ELECTION OF COUNCIL MEMBERS

I would like to remind members again that, under the Rules of the Avicultural Society, all members are entitled to make nominations to serve on the Council. These nominations must include a proposer and seconder and the signature of the nominee expressing his willingness to serve if appointed, and should be received by the Hon. Secretary not later than 1st October in any year for vacancies in the year following. Up to 15 Council Members can be elected and they serve for five years. Usually three Council Meetings are held in a year, mostly at the Society's offices preceeding a social meeting. When electing members, the Council gives great consideration as to whether the nominee will be able to make a positive and useful contribution to the Society's activities, particularly the *Avicultural Magazine*, but also in recruiting new members and helping with social meetings.

Hon. Secretary.

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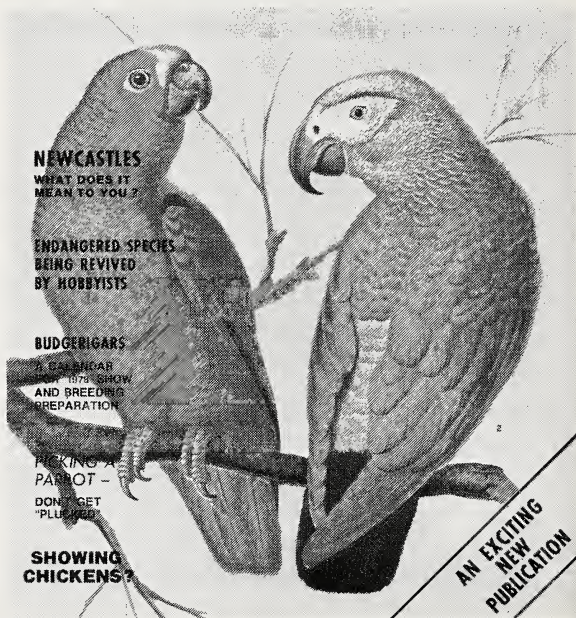
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THE AVICULTURAL MAGAZINE welcomes original articles that have not been published elsewhere and that essentially concern the aviculture of a particular bird or group of birds, or that describe their natural history. Articles should be preferably typewritten, with double spacing, and the scientific names as well as the vernacular names of birds should be given. References cited in the text should be listed at the end of the article. Line drawings should be in Indian ink on thick paper or card; black and white photographs which illustrate a particular point in the article will be used where possible and should be clearly captioned. If authors wish their eventual return, they must say so when submitting the article and write their name on the back of each photograph.

ADDRESS OF EDITOR

Mary Harvey, Honorary Editor, The Avicultural Magazine, Warren Hill, Hulford's Lane, Hartley Wintney, Hampshire RG27 8AG, England.



Mary Allen

Plate 1: Double-striped Thick-knee female with two chicks
Calabozo, Venezuela

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TECHNIQUES USED FOR HAND-REARING THE DOUBLE-STRIPED THICK-KNEE *BURHINUS BISTRIATUS* AT THE DALLAS ZOO

By TAMARA JONES

(Bird Keeper, Dallas Zoo, 621 East Clarendon, Dallas, Texas 75203, USA)

Introduction

The Double-striped Thick-knee, a plover-like bird, sometimes called a Mexican Stone Curlew (Peterson, 1973), occurs from south-eastern Texas through Mexico, Central America and into northern South America and Hispaniola (Austin, 1961). Black (1953) and Pate (1983) have stated this species to be crepuscular, nocturnal and terrestrial. Its preferred habitat is savannah with brush cover (Blake).

Austin states in his studies of wild Thick-knees that the female generally lays one to three eggs in a nest depression on the ground (plate 1). Pate's studies and those done at the Dallas Zoo have documented that captive Thick-knees generally lay one and sometimes two eggs in a nest depression on the ground (plate 2). The female Thick-knee, in the wild and in captivity, incubates the egg(s) for 26-28 days, hatching precocial, downy young. Artificially incubated eggs have been incubated from 27-28 days. These figures were derived from separate data recorded by both Pate and the Dallas Zoo.

Captive history

At present there are 12 zoos keeping this species that are registered with ISIS. From 1972 to 1984, nine zoos had recorded breedings of the Thick-knee. In 1984, only two zoos successfully bred *B. bistratus* as reported to ISIS; they were Pitts, California, with one chick; and the Dallas Zoo with five chicks.

The Dallas Zoo has exhibited this species since April 1966. From June 1972 to June 1985, there were 11 successful breedings from the two pairs exhibited. One pair is displayed in the Rainforest exhibit together with 18 other bird species. The other pair is exhibited in an enclosure measuring 12 x 10 x 12 ft (3.66 x 3.05 x 3.66 m) with a piano wire front and three

solid walls with two skylights. Exhibited with this pair are 0.2 Gull-billed Tern *Sterna nilotica* and 1.1 Black-necked Stilt *Himantopus mexicanus*. The female (identified as A-4) of the pair exhibited in the 'wire cage' has laid 17 eggs from May 1983 to June 1985. Only the eggs laid by this female have been artificially incubated.

Four of the first five eggs laid by A-4 were discovered broken. Of the 17, eight eggs were broken and seven artificially incubated. Two were left under minimal cage disturbance, and from one of these a chick hatched which was successfully parent-reared. It was decided to remove eggs immediately upon discovery to incubate them artificially. The techniques used at the Dallas Zoo for hand-rearing the Double-striped Thick-knee will be discussed in this paper.

Artificial incubation

Of the seven eggs that were removed from the nest of A-4, four chicks were hatched. Detailed hand-rearing records were kept for all the chicks. The incubator used for all seven eggs was the Marsh Manufacturing Roll-X Model RX 2, with automatic turner (plate 3). The turner rotated the eggs hourly. The dry bulb temperature was kept at 99.5°F (37.5°C) and the wet bulb temperature was kept between 86°F (30.0°C) and 89°F (31.67°C). The relative humidity was calculated as between 56% and 66%.

Before incubating, each egg was weighed with an Ohaus Triple Beam Balance, and the length and width were measured using a dial caliper (Table 1). Each egg was candled with a Lyon Electric Co., Inc., candler Serial No. EE, at various stages during incubation to observe development. After candling, each egg was weighed and the information was recorded to monitor development. Thirty-six to 24 hours before the estimated hatching time, the egg was transferred to a disinfected hatcher, set at the same dry and wet bulb temperature as the incubator. Pate suggests lowering the dry bulb temperature slightly and raising the wet bulb temperature to ease hatching.

Hand-rearing

After hatching, chicks were weighed and injected with 2.5 mg Spectinomycin (100 mg/ml) near the keel. Betadine solution was applied to the umbilicus. An identification number was given and registered with ISIS. Chicks were then transferred to a sterile brooder measuring 19 x 18 x 13 in (0.48 x 0.46 x 0.33 m), with the initial temperature set at 95°F (35.0°C). To control brooder temperature, the brooder top was adapted to accommodate the hood from a Marsh Manufacturing Turn-X Model TX-6 incubator. The temperature was gradually decreased to slightly



Tamara Jones

Plate 2: *B. bistriatus* adult incubating eggs in Rainforest

above room temperature within a three-week period, with the lowest temperature being 80°F (26.7°C). The brooder was cleaned daily with Rocal-D disinfectant and sprayed with a dilute solution of Nolvasan for disinfection.

Six to twelve hours after hatching, food was offered to the chick using tweezers to induce pecking action necessary for food consumption. By holding the food slightly above the head of the chick, it could grasp and consume the food with ease. The fourth hand-reared chick, A-15, would eat only from a white plate or paper towel. It was suggested that the chick could not distinguish the food when it was offered on a dull or dark plate. Each chick was fed a specific hand-rearing diet, four times daily to start (Table 2). Mealworms were fed, moulted for the first week to ease digestion. By the fourth week, chicks were fed twice daily for a period of one week. After 35 days, the *B. bistriatus* juvenile was fed a modified adult Thick-knee diet (Fig. 2). A nutritional analysis of the hand-rearing diet was calculated by Mary Allen and David Baer, Zoo Animal Nutritionists at Michigan State University (Fig. 3).

Daily consumption and growth was recorded during the hand-rearing, using a standard data form (plate 4). Data headings included species name, identity number of chick, date, weight of chick, time weighed, quantity of food eaten, weight of food eaten, time of feedings, and ample space for observational comments. For a comparison development graph of the four chicks, see Figure 1.

Complications

The first chick to be hand-reared, A-9, was helped out of its shell and developed a problem within the first week. The veterinarian examined the chick the second day and noticed the middle toes on both feet were turning in. This problem eventually worked itself out as development continued. The third chick, A-11, developed a loss in appetite the second day. On the third day, the veterinarian injected .75 cc Normalsol with 5% dextrose (electrolyte solution) subcutaneously near the keel. This induced the Thick-knee chick to eat a small amount. A second injection was administered later the same day. Gatorade was given as the only source of liquid that day. By the fourth day, chick A-11 was very eagerly consuming food.

Tap water was given to the hand-reared chicks. All four *B. bistriatus* chicks developed a white crystalline deposit on their beaks above the nostrils, possibly due to overheating. The encrusted beaks were wiped clean daily with distilled water.

Behaviour

B. bistriatus chicks have several interesting behaviours. One chick was

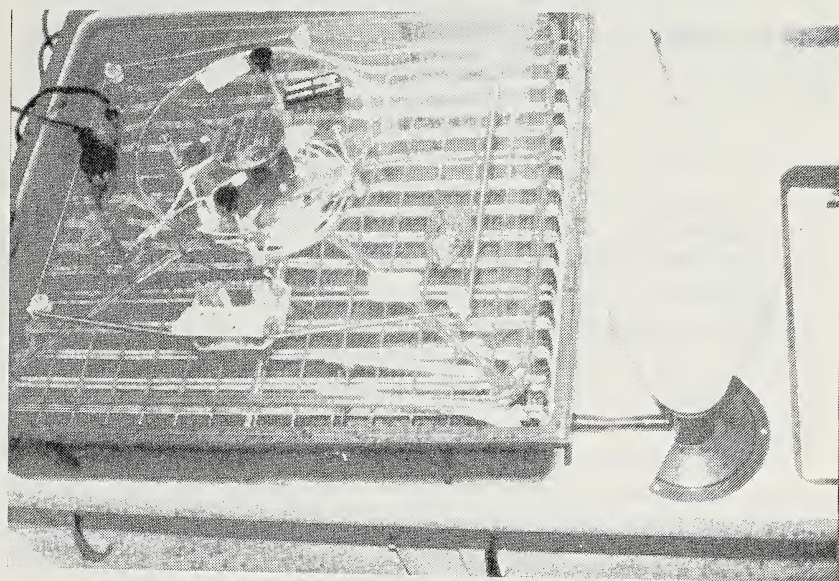


Plate 3: *B. bistriatus* egg

Tamara Jones

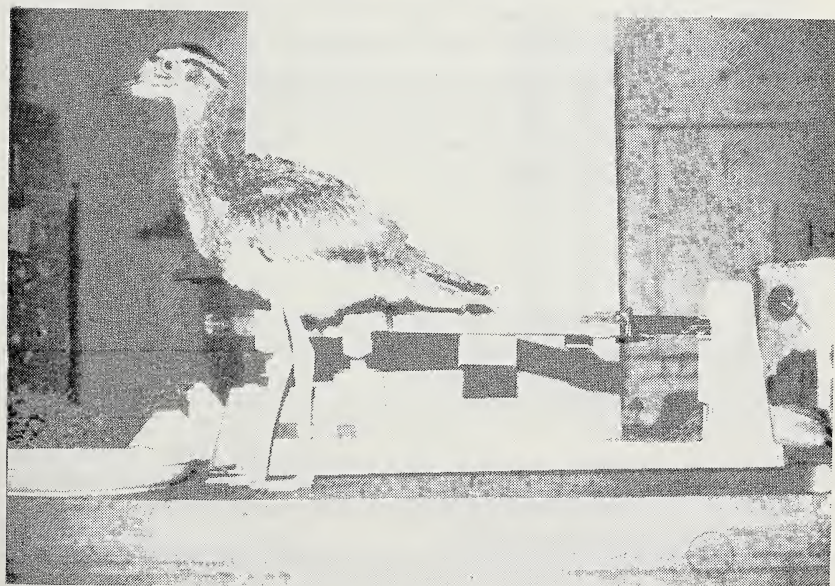


Plate 4: *B. bistriatus* at 28 days

Tamara Jones

observed, when startled by a loud noise or sudden movement, to drop its body instantly as if pulled to the ground. Its entire body was flattened with legs tucked under and its neck flush with the ground. The keeper tried once to pick it up from this alarm position and the chick was very limp, as if it were dead.

Pate discussed a problem of human imprinting with the chicks that were hand-reared at Chicago Lincoln Park Zoo. Of the four chicks that were hand-reared at the Dallas Zoo, none exhibited obvious imprinting upon humans. After 40-45 days, they became very independent and kept away from the keeper. Perhaps the reason that no imprinting occurred while hand-rearing the *B. bistriatus* chicks was the minimal time of human contact during this period. After the first hand-reared chick, A-9, the other three were only weighed for up to 39 days, while at Chicago Lincoln Park Zoo, the chicks were still being pulled for weighing at up to approximately 80 days.

Another behaviour that was particularly interesting was that of the flight of this species. None of the chicks or adults at the Dallas Zoo have taken flight, to the best of our knowledge. Blake reports that they are very swift fliers, but choose to run or walk if possible. Even the adult breeding pair of Thick-knees in the Rainforest exhibit have never been known to fly.

Conclusion

Being involved in the hand-rearing of the Double-striped Thick-knee was thoroughly educational as well as enjoyable. There are several variations to the procedures of hand-rearing this species, but this procedure has worked the best so far. The Bird Department at the Dallas Zoo is always searching for new and better techniques to ensure the successful and healthy hand-rearing of all species.

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DOUBLE-STRIPED THICK-KNEE EGG DATA

TABLE 1.

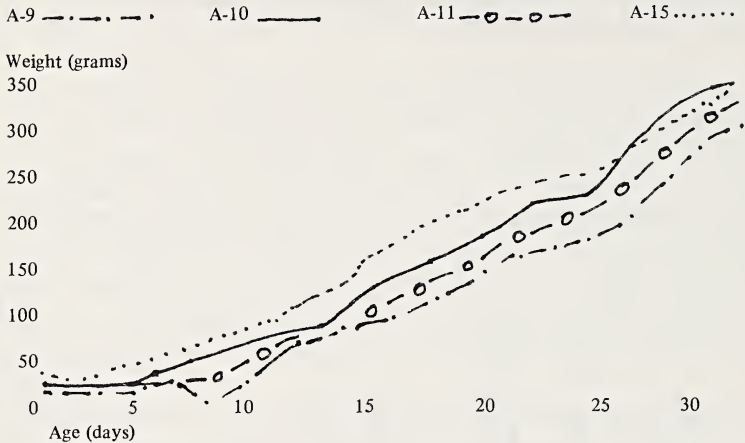
Date laid	Date set	Length (mm)	Width (mm)	Weight (gm)	Incubation	Comments
20 Mar 84	20 Mar 84	57.85	39.85	47.10		Died
10 May 84	10 May 84	59.48	38.54	48.51	28 days	Hatched 5 Jun 84
15 May 84	15 May 84	53.95	38.92	43.80		Died
21 May 85	22 May 85	60.40	39.30	49.00	28 days	Hatched 19 Jun 85
24 Apr 84	24 Apr 84	55.05	39.10	45.50	28 days	Hatched 21 May 84

TABLE 2

Age	Weight (gm)	Basic Diet	Daily Intake (gm)
2 days	31.4	4 x/day	3.4
7 days	49.9	1-2 mealworms, 4 small balls (see below) 4 x/day	7.2
14 days	123.2	10 mealworms, 5 crickets, 6 balls 4 x/day	30.5
21 days	237.0	12-15 mealworms, 7 crickets 15-20 balls 4 x/day	35.0
28 days	332.3	12 mealworms, 8-10 crickets, 15-20 balls 2 x/day 10 mealworms, 10-12 crickets, 15-20 balls	19.1

Diet Balls: 1 T Nebraska Brand Bird of Prey; 1 T Softbill mix; 1 T hard-boiled egg yolk; 1/8 T Chapparral Vitamins; mix together, roll into pea-sized balls.

FIG. 1: GROWTH RATE BY WEIGHT OF FOUR HAND-REARED
BURHINUS BISTRIATUS



DATA ELEMENTS FOR FIGURE 1

Age (days)	A-9 22 Feb 84 (g)	A-10 21 May 84 (g)	A-11 6 Jun 84 (g)	A-15 19 Jun 85 (g)
1	33.0	30.1	32.4	34.5
3	30.6	30.0	30.8	33.0
5	34.5	37.9	33.0	45.1
7	23.9	51.5	41.8	59.8
9	52.2	68.9	58.9	77.6
11	70.0	86.1	75.3	103.0
13	88.5	100.1	95.7	127.3
15	94.2	125.2	111.4	143.0
17	106.3	147.0	135.4	185.3
19	118.0	171.0	150.3	212.2
21	145.7	210.9	186.4	228.9
23	160.5	222.8	214.4	238.7
25	196.1	265.9	246.2	264.1
27	224.9	288.9	-	281.3
29	239.8	303.4	293.5	302.5
31	266.7	323.2	310.4	
33	284.5	371.5	338.5	
35	323.5	384.5	361.4	
37	333.1	395.0		
39	359.8	414.8		
41	371.4			
43	382.8			
45	405.9			
47	412.5			
49	416.5			
51	419.2			

FIG. 2: DALLAS ZOO STANDARD DIET FOR DOUBLE-STRIPED THICK-KNEES.

Once daily:

- 3 T Nebraska Brand Bird of Prey Diet
- 3 T Softbill Mix (see below)
- 2 T Spinach/hard-boiled egg, chopped
- 1/8 T Chaparral vitamins
- 15 mealworms
- 15-20 adult live crickets (3x/week)

Basic Softbill Mix:

- 2 dozen hard-boiled eggs with shell, ground
- ½ lb ground carrots
- ¼ lb raisins
- 1/8 General protein
- ¼ T Chaparral vitamins
- 2lbs ground Hi-pro Dog Chow
- ½ lb Gamebird Chow
- Yields 1¼ gallons

FIG. 3. ANALYSIS OF THE THICK-KNEE HAND-REARING DIET

Thick-knee Balls		23.25g
made of:		
Bird of Prey diet	50 g	
Softbill mix	13 g	
Chaparral vitamins	1.29 g	
Egg Yolk	2.50 g	
Mealworms		7.99 g
Crickets		7.80 g

Some of the nutrient levels in the consumed diet (average of 5 days) are as follows:

Nutrient	As fed	Dry matter basis
Water %	56.6	0
Dry matter %	43.4	100
Crude Protein %	17.3	39.8
Crude fat %	11.7	27.0
Ash%	4.1	9.5
Crude fibre %	1.8	4.2
Calcium %	0.95	2.20
Phosphorus %	0.60	1.39
Sodium %	0.20	0.45
Potassium %	0.35	0.79
Magnesium	0.05	0.12
Vitamin A IU/kg	11699	26966
Vitamin D IU/kg	5970	13761

On a dry matter basis these nutrient levels appear to be adequate for growth, based on established nutrient requirements of other birds (poultry). Data for the other nutrients in the consumed diet is difficult to interpret because of the lack of information on nutrient content in the Bird of Prey and Softbill mix.

THE JAVAN OR BLACK-RUMPED MUNIA

Lonchura leucogastroides

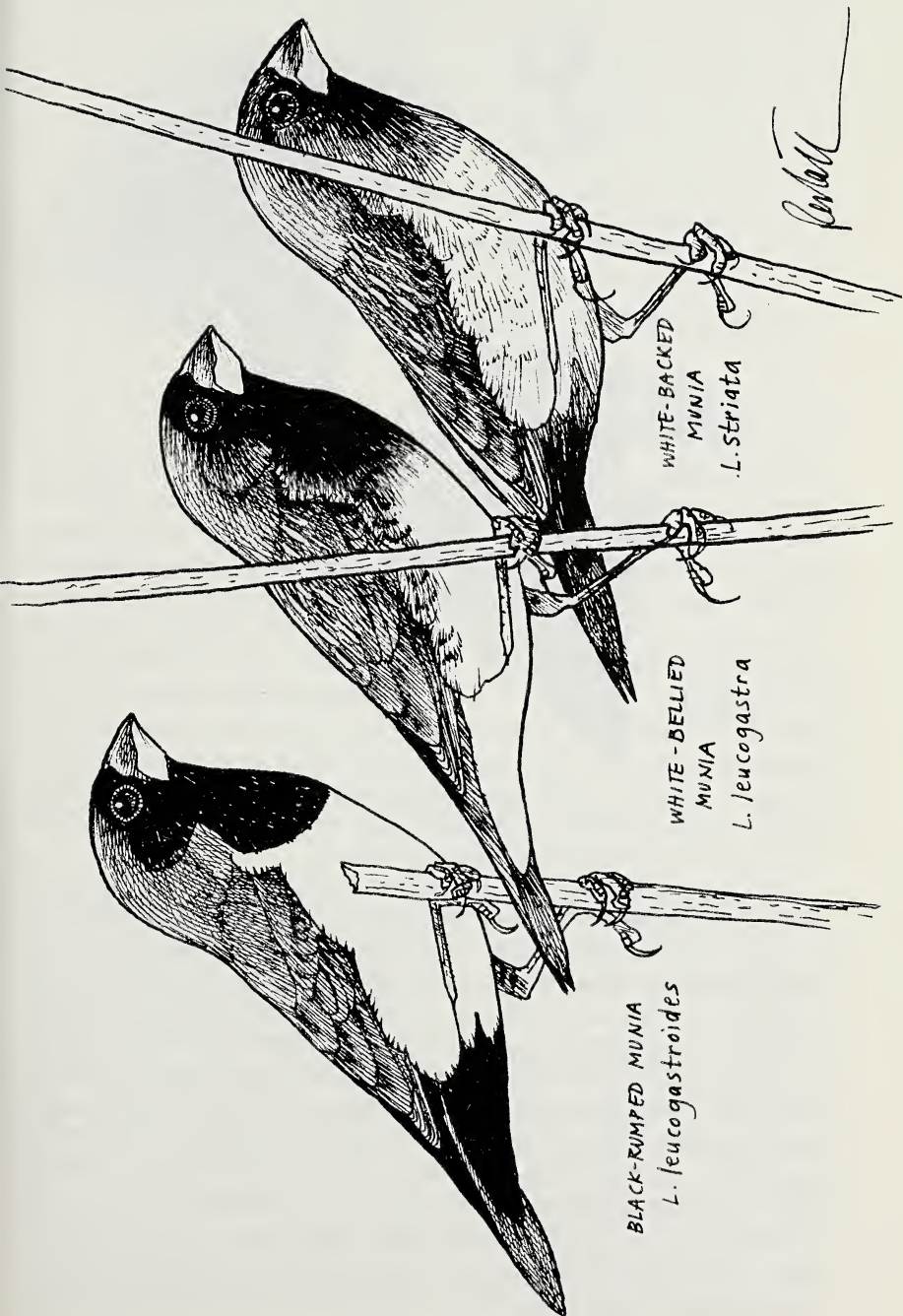
By ROBIN L. RESTALL

(London)

The sun was shining on the balcony of my first floor hotel room in Singapore. The plate glass French windows were drawn wide open and I was inside reading some business papers when my attention was drawn to a small bird feeding among the plants growing along the window boxes at the edge of the balcony. I reached for my field glasses and soon identified the bird as a Black-rumped Munia *Lonchura leucogastroides*. After watching it for a while I put down the glasses and slowly walked towards the bird. Within five minutes I was standing literally within touching distance and watched the bird I had first seen, and its companion, carefully work right along the planter eating the green seeds of the trefoil grass that was rampant among the bouganvillea. It was a most enthralling experience. How I wished my own Black-rumped Munias at home were as indifferent to my close proximity, but no doubt being caught and handled several times deeply impresses upon a bird the untrustworthiness of man.

The Black-rumped Munia is not a natural native of Singapore, having been introduced from Indonesia in the 1920s. However, it ranks firmly as an established local bird nowadays. The secret of its success in Singapore is attributed by Hails and Jarvis (1987) to its habit of feeding on lawn grasses, Bermuda Grass, Buffalo Grass, etc., where the seed heads are found close to the ground. It is widespread, being found on lawns, open parkland, grassland and open scrub. However, it is not exclusively a ground feeder, and may be found feeding in tall grasses or trees and shrubs. I have seen it feeding on paddy in Indonesia and the bird dealers in Jakarta and Surabaya feed it on bunches of dry paddy.

It is a smallish munia, between the size of a Bronze-wing *L. cucullata* and the Striated Munia *L. striata*. Those I have measured ranged between 99 mm and 103 mm, about four inches. The forehead, face, throat and breast are black with a purplish sheen on fit adult birds in fresh plumage; the rump, upper tail coverts and under tail coverts are black, the rest of the upper parts are medium brown. The lower breast, belly and flanks are white. The upper mandible is blackish, the lower pale greyish-blue, the irides dark brown, the legs and feet grey. There are no visible differences between the sexes; however, on one pair of mine that bred (and another pair that did not) there were distinct differences in the flank markings (see illustration). These birds were probably first year adults in basic definitive plumage; when they moulted into adult definitive plumage, the breast



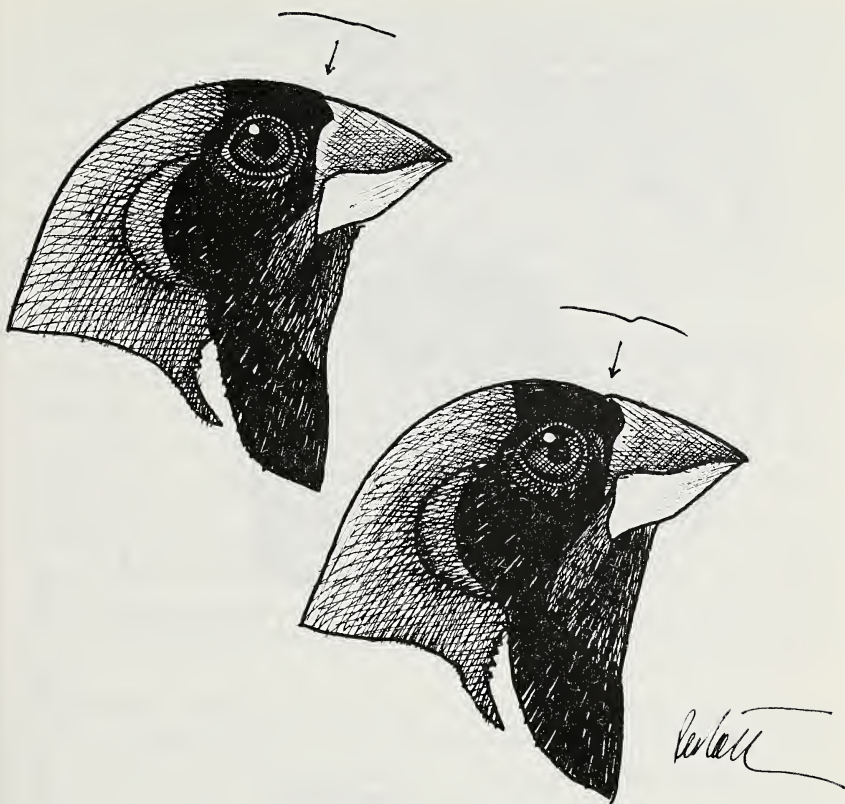


Comparative flank feathers from *Lonchura leucogastroides*
First year adults

became clear white with no flank markings.

The immature is all brown where the adult is brown or black, more chestnut in the parts that remain brown, darker to blackish where the adult becomes black. The belly and flanks are distinctly buff to cream with some streaking. The first year adult retains some brown streaking on the lower breast and flanks, and shows pale shaft streaks on the feathers of the mantle and scapulars. This has led to the bird being advertised and sold as Striated Munia *L. striata*, despite the fact that for obvious reasons the Striated may be referred to as the White-rumped Munia. The full adult, in my experience, loses the pale shaft striations, leaving the back virtually even brown. This does not accord with Goodwin (1982) who appears to describe only immatures and young adults. I have seen several hundred of the birds and must admit that those that I have described as first year adults far outnumber the full adults.

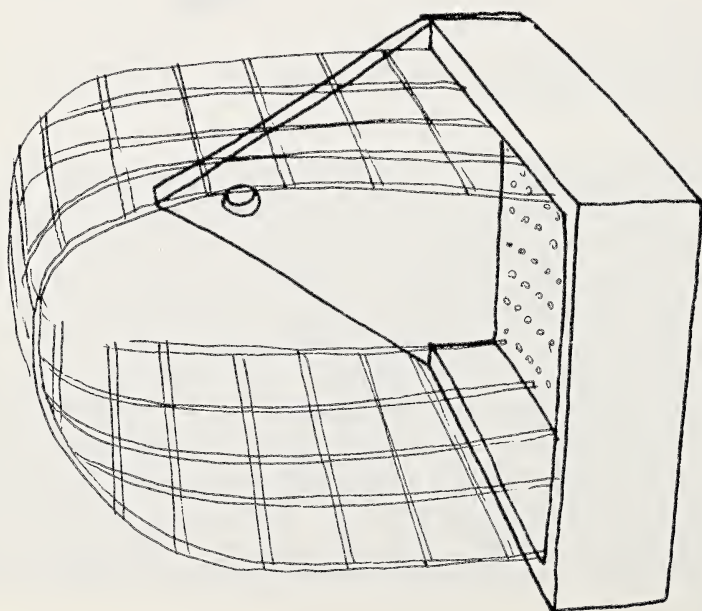
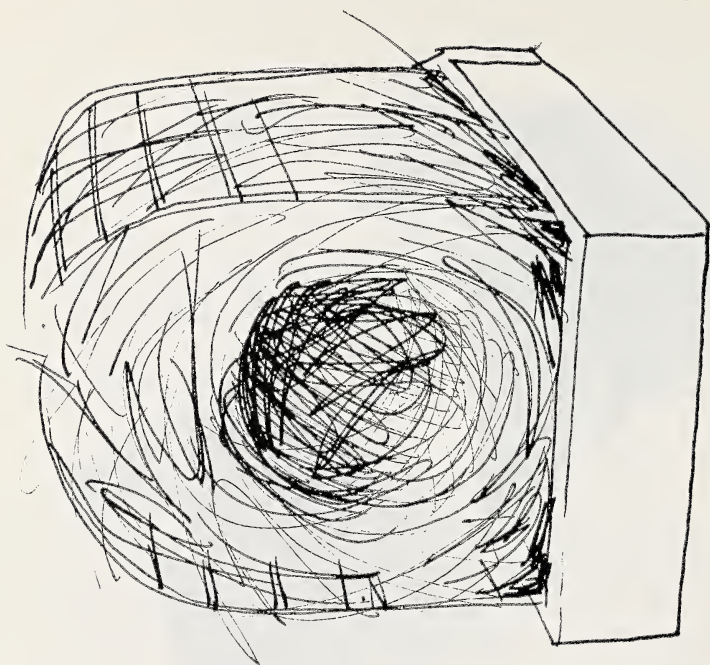
The song and display is typical munia, but lacks the penetrating *peee* notes of the *atricapilla* group. It is similar to the Bengalese *L. striata* dom. but lacks the volume, at least when compared to my particularly vociferous specimen. I have noticed in several munias now, that the contact call note between male and female is a different pitch. This is particularly noticeable if the birds are separated and is a certain way of sexing them. My birds came from Indonesia in August 1985. Every bird in the shipment was in first year adult plumage. I selected five birds that I judged to be two males and three females by the ridge-of-the-culmen method (see sketch). The idea here is that the ridge where the culmen joins the forehead is more pronounced on male birds than on females. It is very difficult to see this, my sketch is a deliberate exaggeration, but it is relatively easy to feel. I then confirmed my diagnosis by my trusty paperclip-on-cotton pendulum sex-diviner, and was thrilled to end up really with what



CULMEN COMPARISON BETWEEN MALE AND FEMALE MUNIAS

I had wanted.

I placed the five in a 6 ft long (1.83 m) flight cage with a large double roll of 3 in (0.06 m) plastic mesh stuffed with straw on the back wall, and large nesting sites (see sketch) at each end. Nests were built in the straw tenement and eggs laid. The egg is typically pure white, 14 mm long, 10 mm wide, oval-shaped and wider at one end. Eventually a nest was built in the separate sites at either end, one of them having a 'cock's nest' on top but being an integral part of the structure. They settled into two natural pairs with one male being very dominant over the other, chasing it persistently. I removed the subordinate pair and the odd female and released them into the outdoor planted aviary. They seemed happy enough, but preferred to stay in the shelter where they nested in a 3 x 3 ft tenement of straw-stuffed, 3 in plastic mesh. They were all found dead in a nest during the winter of 1986-87. The remaining pair stayed together in the large cage.



CANARY NEST TRAY WITH WIRE NETTING HOOD STUFFED WITH HAY

In October 1986 I visited the dealer from whom I had obtained the birds a year previously. To my surprise I saw seven or eight fresh Black-rumped Munias in one of his stock cages. They were labelled 'English-bred Striated Munias, £8 pr'. Apparently a customer who had bought two pairs earlier that year had put them out in his garden aviary with his other small birds, and '....they produced 18 young. He'd brought them into the shop because they bred too easily and had become a nuisance'. I tried to find out who the man was, but 'he's just some fellow who walked in', and he remains anonymous still. He presumably is the first person to have bred the species in the UK.

Somewhat depressed by the apparent ease with which somebody had produced substantial numbers from a munia virtually unknown to British aviculture, I went home to stare glumly at my own Black-rumps. A month later, while I was away on one of my only too frequent trips abroad, they produced two young with obviously no difficulty on a diet of mixed seeds, millet sprays and occasional lettuce. One more adult died during the winter this year, again while I was away (this time on a five-week trip) so I was left with the two own-bred and an odd female. The young male has paired with her and they laid but failed to hatch in April. At the time of writing (May 1987) they have settled down to breeding (?) once again.

The Black-rumped or Java Munia must have been imported from time to time, although finch shipments from Jakarta go mostly to Germany. In that country it is correctly identified and is known to be a free breeder in captivity. In a letter published in *Cage and Aviary Birds* in August 1986, A.E. Nachrichter reported that four breeders had produced 38 young from five pairs. That suggests clearly that it will breed as a solitary pair and not necessarily in the company of its own kind.

Identification obviously is a problem. It may be confused with *L. striata* of the White-bellied Munia *L. leucogastra*, but the latter from Malaysia and Thailand is rarely imported. If so, I strongly suspect it too would be sold as *L. striata*. I hope my sketches help with identifications.

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INCUBATOR HATCHING AND EARLY HAND-REARING OF AN UMBRELLA COCKATOO *Cacatua alba*

By DULCIE COOKE
(Epsom, Surrey)

Every year brings to the aviculturist its thrills and sorrows; the summer of 1986 brought us the unique pleasure and experience of becoming very unexpectedly engaged in the incubator hatching and early stages of hand-rearing an Umbrella Cockatoo.

A pair of these beautiful birds, owned by a friend, have produced a number of young but on this particular occasion, for reasons unknown, the hen had deserted the nest. By the time this was noticed an egg, which had been there for some time, was cold.

It was not thought that it was fertile, but my husband and I were asked to take a look. Hatching should have taken place nearly a week previously, and since on careful inspection it rather looked like a case of 'dead-in-shell', we were requested to open the egg because our friend wished to know more about what had gone wrong with the development of the embryo.

A pin hole was first made in the air cavity, but on listening I could detect no sign of life. Proceeding with very great care the pin hole was gradually enlarged to reveal a terribly dry and hard inner skin, somewhat shrunken within the outer shell. It seemed impossible that life could survive within that desiccated inner covering.

Using a miniature penknife, a very small cut was made in the dry skin (membrane) covering the embryo. A very slight bleeding appeared - that meant life; immediate action was obviously necessary to save the chick. I asked my friend to give me half a hen's eggshell quickly. Within about a quarter of a minute this was fitted, rather loosely, over the opened area of the Cockatoo egg, which was wrapped very carefully in a small towel and placed on a warmed water bottle.

My husband and I brought the egg on the 10-minute car journey to our home and it was fortunate that we had at that time our smaller incubator, a Marsh Turn X, running and adjusted to receive eggs. The Cockatoo egg, with its protecting 'hat' of half a hen's eggshell, was put in the incubator in a small plastic box covered with a piece of clear perspex, which kept the air from the fan away from the egg and allowed it to be seen. The reason for the covered container was to prevent the incubator's circulating air from drying out the membrane. The incubator's turning equipment was switched off at the same time. The temperature was 99.5°F (37.5°C) and the humidity was maximum; the entire incubator was flooded.

About four hours later the egg was inspected and it was already beginning to change, from the 'dead', desiccated look to the healthy appearance of a live embryo. The bright red veins of a very much alive chick, not yet ready to hatch, were clearly visible. The outer membrane or skin was at this stage moistened with warm, distilled water and the egg was returned to the incubator.

The next day, when the egg was taken out, no further progress had been made by the chick; the membrane was moistened again and the egg returned to the incubator. By the evening of the second day the vascular pattern had altered, the veins having disappeared, leaving a very dark red pattern. The membrane was still very tough, and at this stage hatching should have been imminent, but it was obvious from the weak calls of the chick that it needed help.

With a tiny sterilised knife I carefully cut the membrane just sufficiently to release the beak, this enabling the chick to breathe freely. The membrane was moistened again with warmed distilled water, and a tiny drop was dripped on to the beak of the chick. This was repeated about three hours later, but this time glucodine was added to the warm water dripped on to the chick's beak, which was by now opening to accept the 'drink'. The quantity of glucodine was as much as would go on the tip of a pointed kitchen knife to a teaspoonful of boiled, lukewarm water.

Early in the morning of the third day it was decided to assist the chick further, so bits of outer shell and inner membrane and skin were removed with infinite care at intervals during the day, always bearing in mind that the chick could not be long out of the warmth of the incubator. By late evening the chick was 'sitting' in a sort of 'cup' consisting of the remaining bit of outer shell and the portion of membrane protecting the egg sac. It was realised, of course, that any damage to this vital part could cause the death of the chick. Glucodine and warm water were being taken regularly now in tiny quantities. The above exercise was doubtless as exhausting to the chick as it was to me because of the extreme care necessary, so it was decided to leave the chick for the night to see if it could free itself of the last 'egg cup' of shell, etc.

At 5.30 a.m. on the following morning I took the chick out to give it some obviously welcome glucodine and warm water, and having prepared a slightly warmed saucer, tipped the chick very gently on to its side. It fell out of its 'cup' without further problems, the egg sac having been completely retracted. A healthy, if tired, chick was then returned to the incubator.

Two hours later the chick was given its first feed from a tiny spoon. This consisted of equal quantities of pure yoghurt and a Heinz fruit juice for babies, called at that time 'Fruit Desert'; this was mixed with

boiled warm water to the consistency of skimmed milk. The second meal, two hours later, was one part Heinz baby fruit juice, one part Milupa 'Autumn Fruit Harvest' (a baby food) and one part Prewett's Oat Bran and Oat Germ (from health food shops), mixed with warm, boiled water to the consistency of skimmed milk, as before. This meant that the solids were approximately 10% of the whole. Great care was taken not to overload the tiny crop. The third feed was the same as the second except that instead of the Milupa baby food, one quarter part of Cow and Gate 'Beef and Bone Broth' (a baby food) was given, the whole being brought to the same consistency. This broth was only given once per day, which seems sufficient to help with the bone-building process.

At this stage the chick was weighed; it was 20 grams exactly and it was transferred to a very small, tissue-lined box and put in a brooder. The temperature was kept at 99.5°F (37.5°C). Feeding continued every two hours until 12.30 a.m.; the next feed was at 3.30 a.m., followed by one at 6.00 a.m., when the two hour feeding was resumed. Colour photographs were taken on the first day, and at intervals, to record the chick's progress.

By day three the chick weighed a fraction over 20 grams, and had its last dose of yoghurt, which had been given once per day. There seems to be a great deal of difference of opinion about whether or not yoghurt can be assimilated successfully by baby parrot-type birds. It was decided not to experiment with this rather special chick which was not owned by us, but to continue with a tried routine of giving the chick a tiny quantity of diluted yoghurt once per day for the first three days.

On day four the chick weighed 20.5 grams and was doing well. A small quantity, equivalent to about half a part of soaked, chopped and thoroughly crushed sunflower kernels was introduced to the feed, plus one part of Milupa 'Mixed Vegetable' variety, and one tiny drop of Collo-Cal-D was added as well. This was repeated on day five, but that night the chick became very ill and lost his voice. The heat was maintained at 99.5°F (37.5°C) and a little warm, boiled water was given at intervals.

The chick was much better on day six, but the Milupa Mixed Vegetables variety, the soaked sunflower kernels, the Collo-Cal-D and the Beef and Bone broth were all excluded from the food. On day seven the chick weighed 30 grams, and was not fed for five and a half hours during the night. The Beef and Bone broth was reintroduced and one tiny drop of Collo-Cal-D was given once during the day. This is a very good source of D^2 , and a good bone builder; it must be obtained from a veterinarian. Provided that it is given very sparingly, baby parrot-type chicks seem to be able to tolerate it quite well.

At this stage the quantities of the mixture of foods were altered to half

a part of fruit juice, two parts oat bran and oat germ (Prewett's) and two parts of Milupa 'Autumn Fruit Harvest'. The Milupa 'Mixed Vegetables' variety was not tried again as its content of many sorts of vegetables did not seem to suit the chick.

At the beginning of the eighth day the young bird slept happily from 12.30 a.m. to 6.30 a.m. A mere dusting or peppering of ground cuttlefish 'bone' was now added to one feed per day, and the Beef and Bone broth was increased to half a part, and, as before, given only once daily. The temperature had been gradually reduced to 96-94-then 92°F (approximately 35.5-34.5-33.5°C). Half a part of *dry* sunflower kernels, ground in a coffee grinder and then put through a fine sieve was introduced to the food. A few days later this was increased to one part. It was fed once per day. The Collo-Cal-D was continued, giving one drop in one feed per day.

By day ten the Umbrella chick was strong and well, with a tremendous will of his own, and quite a loud voice. He (she) weighed 40 grams. Well wrapped up and sitting in a box with two well insulated hot water bottles, the young bird was taken the short car journey to his owner and installed in a brooder. As time went by, foods such as very finely grated raw carrot and very finely chopped lettuce and cabbage were introduced, also finely chopped, cooked sweet corn. Soaked sunflower kernels were supplied as the baby grew older. Photographs of the young bird's progress continued to be taken. At the age of approximately five months he went to his future home where, according to reports, he very nearly rules the house. If there is something to learn from this experience, it is that one should never be in a hurry to discard an egg.

* * *

MIXED-SPECIES WALK-THROUGH AVIARIES BLESSING OR BURDEN?

By MARY HEALY (Curator of Birds, San Antonio Zoo, Texas, USA)
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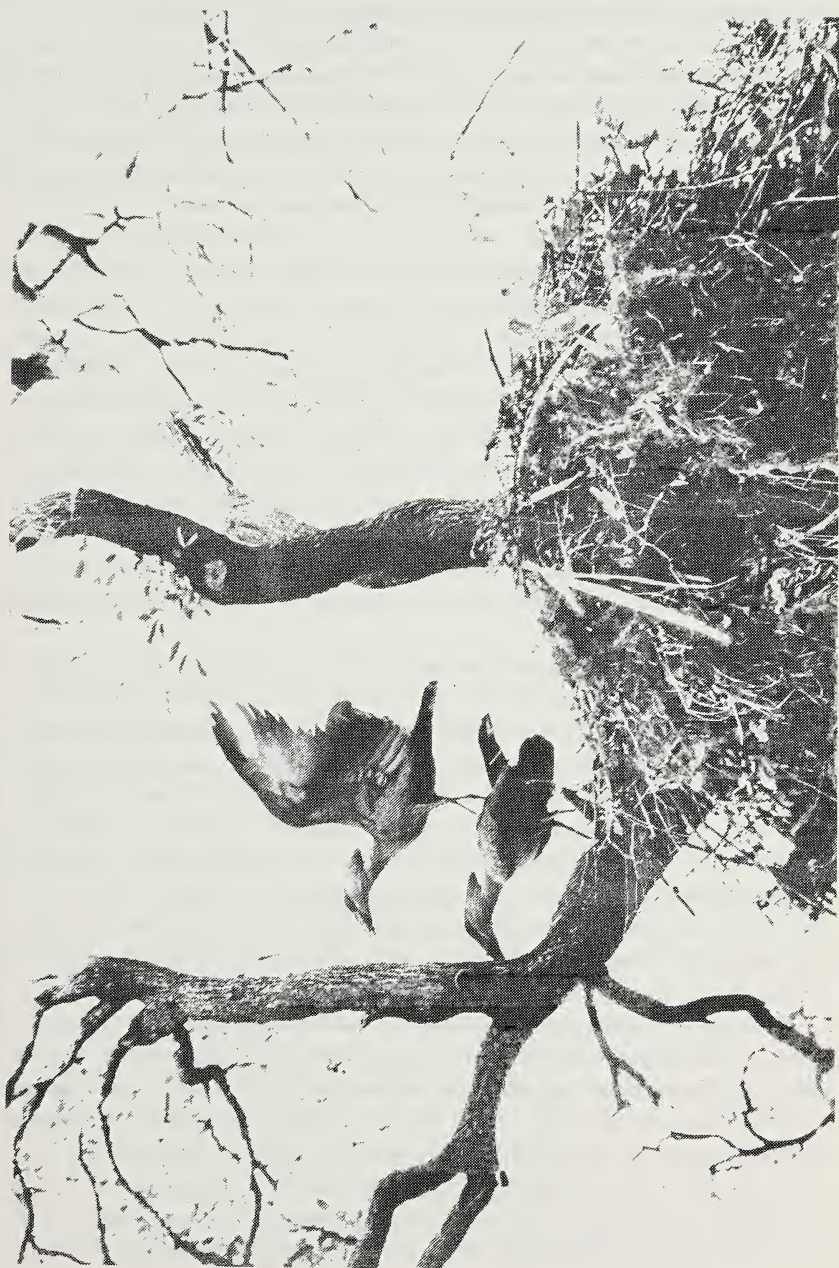
Zoo design is a rapidly evolving field. Changes in exhibit philosophy, as well as technology, have meant vast improvements in the way animals are kept in zoos. It is no longer sufficient to build exhibits based only on their ability to contain the animals; now the emphasis is on exhibiting them in natural habitats.

In the avian field, one of the most obvious outcomes of this changing attitude is the walk-through, mixed-species aviary. The zoo visitor has become less tolerant of caged animals peering through bars and more aware of animals 'Born Free'. This design satisfies the desires of the visitor; in a well-planted, natural setting the visitor perceives the birds to be free. By being in the exhibit with the birds, he shares their environment and is much more aware of the sights, smells and sounds around him. It also, of course, permits the creation of spectacular displays of plants and flowers, particularly tropical species so that often it is as much a botanical as zoological exhibit.

This style of exhibit gained popularity very quickly and numerous zoos have constructed similar style exhibits over the last two decades. Clearly the goal of these early flight cages was primarily to serve as a positive experience for the visitor; a striking exhibition to impress them with large numbers of birds and plenty of flash and colour. In an article in the *International Zoo Yearbook* 1975, Kerry Muller describes the exhibit philosophy behind some of the early flight cages.

'Their entire concern is with providing a spectacle for the public the sole criteria for their choice being colour, size and variety'. In a paper given at a 1975 meeting of the American Association of Zoological Parks and Aquaria, Bob McMorris describes the same sort of outdated exhibit criteria: '..... the decision as to which birds were placed in this exhibit was based originally on color and not compatibility'.

The old exhibits still exist and new ones are being built almost annually. Have the goals of such an exhibit changed? With conservation being the cry of zoos in the 1970s and 1980s, are the flight cages reflecting this change in animal management philosophy? To a great extent they are. The numerous articles that are written about such aviaries fall into two categories: 1) those written at the time of the opening, e.g. Klos (1962), Motterhead (1966), Griswold (1972), Lint (1960); 2) those written years



Hammerkopps nesting in the Rift Valley Aviary at the San Antonio Zoo. Birds with large nesting requirements do particularly well in flight cages.

later as renovations and improvements are needed, eg. Reuther (1973), Reed (1966). For the most part, the improvements are a shift from the emphasis on visitor satisfaction to meeting the needs of the birds.

The changes were prompted by several factors. Conservation *has* gained importance and these aviaries typically had low reproductive potential and high mortality. At the same time, education and the quality of the visitors' experience has received increased attention. The goal is no longer just to expose the public to a large variety of species. To teach them fully about a species, it is necessary to simulate its natural environment.

The biggest change has come in the number of birds that zoos have attempted to exhibit in these aviaries, and the numbers of species and specimens have been greatly reduced. Many aviaries of the 1960s had a density of birds equivalent to one bird for every 25-50 ft² (7.6-15.5 m²). By contrast, ten zoos contacted recently reported an average of well over 100 ft² (30.5 m²). More of an effort has been made to exhibit species in pairs and many zoos have tried to develop a unifying theme, such as a common geographical origin to illustrate how the species would co-exist in the wild. Although this is a step in the right direction in concept, new problems have been generated. Paired species that are nesting are much more territorial and aggressive towards other birds. Nesting mortality is high. The 'theme' concept limits the choice of potentially compatible species.

Some of the biggest problems with such an exhibit are inherent in its design and can be managed to some extent but not solved. The lack of control, inability to capture individuals or at times to obtain an accurate inventory are the major frustrations expressed by zoo aviculturists. Other aspects such as plant care, pest control, graphics, and new bird introductions can all be handled in some fashion (see Appendix 1). However, even with all the problems involved, it is still recognised that these are very popular exhibits and if managed properly, mortality can be minimised and breeding potential maximised. Such exhibits can be very effective and if the limitations are not ignored, the avian population need not suffer.

With that in mind, it seems that the best way to minimise significant losses in this style of exhibit is through the careful selection of species. There is always a risk involved in releasing a bird into a flight cage, or any new environment, but that is why it is so critical to take into account the availability of the species when selecting birds to be exhibited. The status in the wild as well as in captivity should be evaluated and well-established, commonly captive-bred species should be chosen rather than rarer ones. Many institutions have active off-display breeding facilities,

giving them the potential to become their own suppliers, restocking the aviary with captive-bred offspring. Fortunately, some species have done so well in captivity that the current need to reproduce them has decreased. As long as their status is carefully monitored and maintained, these species are a good choice. The White-cheeked Touraco and the Superb Starling are two examples. In 1966 the *International Zoo Yearbook* reported less than 10 Superb Starlings, hatched at three zoos. In 1984, 143 Superb Starlings were hatched in 24 zoos. The *International Zoo Yearbook* reported only two White-cheeked Touracos, hatched in one zoo, in 1966 but in 1984, 50 Touracos were produced, at 14 zoos.

There are a number of species whose populations in captivity are excessively of one sex. Though not yet well-established in captivity, they are still a good choice because they are not depleting a potential breeding population, e.g. the Naked-throated Bellbird.

Reproduction in these large aviaries is certainly not impossible; a number of zoos do quite well, but most still express the attitude that the birds breed in the flight cage despite the obstacles. In a survey of 10 zoos, 31% of the species housed in flight aviaries exhibited some reproductive behaviour. The survival rate of young, however, was only 18%. Most successful reproduction occurred in larger, relatively aggressive groups of birds such as waterfowl, starlings, rails and pheasants. Clearly, some species do benefit from the spaciousness of a large, planted aviary. Hammerkops, with their large nest requirements, are a good example.

The responsibility rests with us to practice what we preach. Aviculture has made great progress in captive reproduction programmes and these should not be compromised by reverting to exhibits for show only. Vast improvements in techniques have greatly increased the compatibility between 'display' and 'conservation'. Exchange of information and experience through publications such as the *International Zoo Yearbook* and the *Avicultural Magazine* is vital and there is still a need for curators of mixed collections, both publicly and privately owned, to realise this. There is so much to be gained by everyone from this sort of co-operation but much valuable data still goes unrecorded because of a general reluctance to write on the part of zoo curators and private owners.

If we make the effort, we have the ability to reduce mortality, increase reproduction, improve education and conserve rare species without sacrificing the public's enjoyment.

APPENDIX 1

Outline of problems and attempted or suggested solutions:

A. *Climate*

- (1) Move the birds inside during the winter months
- (2) Provide shelter boxes and/or heat sources
- (3) Exhibit only those species hardy enough to tolerate winter

B. *Plants*

- (1) Establish well before introducing birds
- (2) Monitor continually, replace regularly
- (3) Use pest controls that are safe for birds
- (4) Use rocks and logs to protect roots
- (5) Place wire around plants until established

C. *Competition and Aggression between Birds*

- (1) Introduce least dominant first
- (2) Maintain plants for cover
- (3) Exhibit odd sex birds or immatures to forestall breeding and aggression
- (4) Provide multiple feed stations and nesting sites
- (5) Remove repeat offenders

D. *Glass Walls/Ceilings or Skylights*

- (1) Tint glass
- (2) Cover when introducing birds using sheets, soap, tape
- (3) Remove a few primary feathers to slow bird initially

E. *Aggression from Birds to Public*

- (1) Design walkway to allow majority of exhibit to be inaccessible to public
- (2) Remove repeat offenders
- (3) Avoid imprinted birds

F. *Aggression from Public to Birds*

- (1-3) As in 'E'
- (4) Provide adequate rail or border along walk
- (5) Do not allow public feeding
- (6) Station volunteers or keepers to monitor

- G *Graphics*
- (1) Duplicate in several areas
 - (2) Supplement with printed hand-out (litter problem)
 - (3) Supplement with volunteers or keepers
- H *Public Over-crowding*
- (1) Charge nominal fee
 - (2) Design for one-way traffic
- I *Monitoring Birds*
- (1) Colour bands
 - (2) Take daily inventory before public enters exhibit, using live food to attract birds
 - (3) Use binoculars
 - (4) Establish routine feeding schedule
- J *Introducing New Birds*
- (1) Use holding cage
 - (2) Introduce out of the breeding season
- K *Removing Birds from Exhibit*
- (1) Build trap doors into feed stations
 - (2) Design rock work for easy access to high spots in exhibit
- L *Predation of Young Birds by other Bird Species*
- (1) Remove eggs or chicks for hand-rearing
 - (2) Remove predator
 - (3) Remove young at critical fledgling time
- M *Choice of Species*
- (1) Consider status in the wild and captivity and evaluate breeding potential in a flight cage setting, e.g.:
 Pro - Hardy birds such as Hammerkops which require a large area for nesting
 Con - Delicate softbills that would breed only in a low competition environment
 - (2) Establish controlled breeding facilities to stock flight cage
 - (3) Choose species that are being readily bred at other facilities
 - (4) Vary family groups represented, ie. one starling species, one pigeon species.
 - (5) Vary species according to habitat niche.

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**THE TODIDAE:
A DESCRIPTION OF THE TODY FAMILY**

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Natural History

Belonging to the Order Coraciiformes, this monotypic family Todidae, consisting of the genus *Todus*, is made up of five Greater Antillean species.

Termed by some ornithologists as a 'superspecies', these diminutive, short-tailed avian gems have features that are somewhere between those of the motmots and the kingfishers. They are, in fact, very closely related to the former, and distantly to the latter. They are also reminiscent of miniature puffbirds, complete with rectal bristles, exemplifying their almost exclusively insectivorous diet (Bond, 1980).

They catch their food in a very similar manner to that of Redstarts *Myioborus* and Tody-flycatchers *Todirostrum*, and this is explained very well by Ann Keplar (1977). She divides the feeding methods into two principal and four subsidiary foraging techniques. Leaf-feeding (87%) and air-feeding (8.8%) are the preferred methods and embrace the major portion of time spent foraging, whereas hovering and tree-trunk snapping are secondary. Keplar also found that the diet consists mainly of small flies, beetles and lantern flies, and is supplemented by crickets, grasshoppers, cockroaches, moths, caterpillars, other insects and spiders. Although todies are quite territorial, at times they join temporarily with interspecific feeding flocks passing through their tract.

Vocalisations produced by todies are simple, unmusical whistles, buzzy and nasal, but are quite distinctive between the species (Keplar, 1977). A 'slightly-rattling whirr' or 'snapping' during flight is also characteristic. This unusual sound is due to an attenuated outer primary feather. So unique is this sound that it is often used as a means of tracking these wren-sized birds amongst the dense foliage. Outside the breeding season, which lasts from January to May, they are seldom vocal, although when chasing prey, a wooden 'snap-snap' is very often heard which is made by the large hollow beak while catching insects (Gruber, 1981).

Tunnel nesters

Like practically all other Coraciiformes, todies nest in self-excavated, short tunnel holes, utilising banks in like manner with bee-eaters and some kingfishers. However, unlike the mostly colonial nesting habits of bee-eaters (Meropidae), todies are not gregarious. They neither flock, nor nest socially, but rather prefer to select a suitable bank within their home range and vigorously defend their territories during the breeding season (Keplar,

1977). As with all Coraciiformes, male and female build their subterranean nest collectively. So strong is the pair bond that the majority of todies remain coupled throughout the year (Gruber, 1981).

Todies seem to prefer semi-circular-shaped, vertical banks, often sheltered by branches, roots or rocks to minimise erosion. However, they will also use virtually anything similar from shallow-sloping ground, to dried cattle hoofprints, to old tyre tracks (Keplar, 1977; Lack, 1976). Almost any easily excavated soil is used, although marl or clayish banks are most popular. After constructing a curved, 30-45 cm long burrow with an unlined nest chamber at the end, the hen will lay a single clutch of one to four glossy white eggs; these are the smallest in the family.

The incubation period lasts 21-22 days. While both sexes share in the incubating, the female devotes more time to it (Keplar, 1977). During this period, some todies welcome the assistance of nest-helpers. These helpers are scant, and seem to be most prevalent in the nestling phase. Young fledge in about three weeks and are fully weaned by their sixth week, yet in captivity they average slightly longer (Gonzalez, 1976). Throughout this nestling phase, todies are most vulnerable to predation, and many fall victim. Besides their major threat, the mongoose, they must also contend with rats, other birds, humans and miscellaneous creatures which also use burrows.

Agriculture

If ever a list of the most appreciated birds was compiled by farmers in the West Indies, the todies would surely be at the top. Being insectivorous they wreak havoc on insects in tropical plantations. It is easy to understand why they are legally protected throughout most of their range. Even so, todies and their eggs are still fair game for villagers seeking supplementary protein. Fortunately, this problem is locally insular. Suffice to say, todies are abundant and their populations are quite stable.

THE TODIDAE

Todus angustirostris Narrow-billed Tody

Local names: Chicorette; Colobri; Pichui; Barrancoli.

Identification: 11 cms. Adults: upperparts including forehead, crown, superciliaries, lores, nape, hindneck, mantle, rump, upper tail coverts, wings and tail - vivid green; chin and malar region - white; gorget - red; breast - grey; sides - grey turning to hot pink at flanks; belly and thighs - buff; crissum - yellow; bill, upper mandible - blackish, lower red with distal black. iris - white; legs - dark grey. Sexes alike. Immatures: paler overall; gorget - pinkish; iris - grey; bill - one half size of adult and pinkish;

legs - pink.

Call: A chattering, trilly *chippy-chippy-chippy-chick*, a discordant *tick-cherek*, and a *chip-chee*, at times varying to a *chip-chui* or *chic-o-ret*.

Distribution: Hispaniola.

Habitat: Found from sea level up to 3200m, but generally confined to dense, high elevation damp jungles, pine forest and mountain shrubbery; also dry lower montane forest.

Todus mexicanus Puerto Rican Tody.

Local names: Barrancolino; San Pedrito; Medio Peso.

Identification: 11 cm. Adults: similar to *angustirostris* but lores lighter green; gorget - orange-red; trace of blue on secondaries and tail; yellow flanks extending to lower belly; bill not distally black; iris - male slate, female white; legs - grey. Immatures: slighter paler; gorget - dark pink; legs - pinkish-grey.

Call: (Keplar, 1977) describes a *beep* and loud *beep* as year-round vocalisations, and a *bee-beep*, *beep-trill* and a guttural feeding call as being almost confined to the breeding season.

Distribution: Puerto Rico and Mona Island (Faaborg, 1980), absent from the smaller offshore islands (Keplar, 1977).

Habitat: Found from semi-arid coastal areas to humid mountain slopes but is most numerous in lower cordillera forest where large concentrations of epiphytic and understory vegetation abound (Keplar, 1977).

Todus multicolor Cuban Tody

Local names: Carta Cuba; Pedorrera; Barranco-Rio.

Identification: 11 cm. Adults: similar to *angustirostris* but lores, forehead and front superciliaries yellow with green trace; pink flanks; blue subauricular patch; trace of blue on secondaries and tail; greyish-white breast; belly and thighs - white; lower mandible - orange-red with no black tip; iris - male white, female slate; legs - pink. Immatures: overall colours duller; no yellow on head; iris - usually slate; legs - light pink; bill - smaller and pink.

Call: An almost musical, four-part whistle, very distinctive.

Distribution: Cuba and the Isle of Youth (formerly Isle of Pines).

Habitat: Ranges from shrubbery, arid scrub and woodland, to high montane forest. It is also the only *Todus* to frequent the shoreline (Keplar, 1977).

Todus subulatus Broad-billed Tody

Local names: Barranquero; Colibri; Barrancoli.

Identification: 11.5 cm. Adults: similar and slightly larger than *angus-*

tirostris, but red gorget less intense; vent - yellow turning to greyish-white at breast with pink wash; bill broader, lower mandible entirely reddish; iris - slate; legs - blackish. Sexes alike. Immatures: like *angustirostris* but legs light grey.

Call: A clear, metallic-like whistle, *terp-terp-terp*; repeated monotonously.

Distribution: Hispaniola and Gonave Island.

Habitat: Most abundant and adaptable species. Found from 40m below sea level to 1700m, but seems to prefer semi-arid lowlands and lower montane forests; distinctly absent from very humid higher elevation montane forest.

Todus todus Jamaican Tody

Local names: Robin; Robin Redbreast.

Identification: 11 cm. Adults: resemble *angustirostris*, but yellow vent turning to yellow-green at belly and breast; rear malar region sometimes with blue-grey trace; pink flanks reduced; lower mandible - entirely red; iris - randomly white or grey. Sexes alike. Immatures: resemble *angustirostris*, but breast distinctly greenish; legs lighter grey (Gonzalez, 1976).

Call: A short, nasal *cherk*, *cherrrk* (Gruber, 1981).

Distribution: Jamaica.

Habitat: Islandwide, from sea level up into high elevation forest, but seems to favour riverine forests and glades (Gruber, 1981; Lack, 1976).

Aviculture

The captive history of todies is quite scanty, and good literature about them is equally limited. *Todus* species have been housed in only a handful of zoological and private avicultural collections and never with much success. The fact that these insectivorous birds also have a high metabolism is the main reason why they do not thrive for any appreciable time. Todies consume a minimum of 40% of their own body weight in insects daily during the non-breeding season (Griswald, 1959). Although some literature claims that the very rarely kept tody can be maintained properly on a simple diet of mealworms, fruitflies and crickets, I disagree. Not only is this wrong and misleading but shows an unfamiliarity with the Coraciiformes generally. The mere fact that todies devour such a wide variety and quantity of insects, reflects the obvious difficulty in its captive survival. From past experiences, I have found that immature todies offer the best results, as do young adults (one to two years old) which were banded in the wild as immatures, and then captured after one or two breeding seasons. Fortunately todies are quite docile, lending themselves as good avicultural subjects once the problem of initial captive establishment is over-

come.

As mentioned, most of the sparse literature available on *Todus* is contained within general avian works or field guides. But it is interesting to note a fine monograph of Todidae published in 1977 by the Nuttall Ornithological Club, written by Angela K. Keplar, PhD. Although the framework centres on *Todus mexicanus*, it also contains pertinent and useful information on all of the five *Todus* species. This book is undoubtedly the finest ornithological literature on todies to date. Anyone interested in obtaining a copy of this monograph should contact the Nuttall Ornithological Club, c/o Museum of Comparative Zoology, Harvard University, Cambridge, Mass. 02138, USA.

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BREEDING THE SILVER-BEAKED OR MAROON TANAGER

Ramphocelus carbo

By L. GIBSON

(Burnaby, British Columbia, Canada)

Articles on tanagers have disappeared from the literature in the past decade. This is perhaps due to the lack of availability of these attractive and easily-managed birds. As the Silver-beaked Tanager has been widely kept (and bred too) in the past, these notes will be restricted in detail.

Anyone wishing general information on tanagers should begin by reading A.F. Skutch's *Life Histories of Central American Birds* (1954: Pacific Coast Avifauna 31, Berkeley) .

The Silver-beaked is not the brightest coloured of tanagers but its attractiveness lies as much in the texture of the feathers as in the colour. When in breeding condition, both the male and the female have a deep plush appearance on the head and shoulders. The male should be a rich dark maroon all over, while the female should have a somewhat less intense shade on her head and neck, the rest of her feathers being dark chocolate brown, just tinged with maroon. The male, of course, has a swollen silver lower mandible.

When I obtained these tanagers in summer, they were (for a change!) in good condition, except that they were in poor colour and their wings were frayed from beating about in the carrying cage. They never ever calmed down and, along with *Garrulax canorus* (Melodious Laughing Thrush or Hwamei) ranked as the most nervous birds ever kept. Thus they should be kept in a bushy aviary rather than in a cage. Juveniles born in captivity were almost as wild as the parents and never calmed down either.

The tanagers were put out in a heavily planted conservatory where they immediately disappeared into the foliage and rarely showed themselves thereafter.

The shelter was a lean-to aviary built on the south side of the house from acrylic sheeting. It measures 18 x 9 x 10 ft high (5.48 x 2.74 x 3.04 m) and is heavily planted with, among other things, a lemon tree, fig tree, loquat tree, several large camellias and a clump of fine-leaved bamboo. This place never quite drops to freezing in the winter and is heated by solar absorption.

The birds settled well and by the end of October had moulted into very fine feathering. Unlike the Chloropsis and Shama with which they shared the enclosure, they were nervous of intrusion and fled at speed

right through the foliage to the far end. They were the only birds that were able to fly straight through thick plants. The tanagers never molested the other birds, but maintained a bold front in the face of the other two quarrelsome types, and so were never bullied.

They were easily catered for with a basic diet of sweet rice pudding (boiled in milk), bread with peanut butter and the few mealworms that, because of their speed, they were able to snatch from under the bills of their tamer room-mates. Frequently they drank the nectar put in for the Chloropsis, and ate sparingly of the latter's banana. A preferred food which the tanagers took with great eagerness was any soft berry in season. These included blueberries, blackberries and raspberries. However, they would not touch any hard berries, like holly or pyracantha.

A bath was permanently available and no doubt they took regular advantage of this but, because of their jittery disposition, were rarely observed bathing.

They passed the winter looking very fit, the male weighing 33 g and the female half a gram lighter. At the end of December, the hen was seen carrying a leaf, but no other activity was noted until the spring.

On 1st March, the hen was seen displaying to the cock, who remained hidden in a bush. She fanned her tail, bobbing it up and down, bowing all the while. Later in the year she was seen to repeat this display while holding a twig. Again the male remained out of sight. He was never seen displaying but on three occasions was heard to sing a rapid, thin, high-pitched song quietly into the ear of the hen. This song was similar in style to that of *Cyanerpes cyaneus*. The cock also made a quiet chirp at the feeding tray to bring down the hen, but otherwise they were very quiet, communicating during the rest of the year with a single piping note.

In a 14-month period, from March to May of the following year, nine nests were built. Seven of these were in the conservatory and two were outside in a small, roofed-in, planted flight. The nest-building months were March, April, May, June and September. Although of loose, rather open construction, all the nests were well made and well anchored. In contrast to many other nests, they never disintegrated while in use and so never needed to be shored up. The spot chosen for building was always in the densest and darkest spot available. No nest was used twice so new nests were usually built very close to the old ones, at from 1½-5 ft up (0.46 - 1.52 m). Nests were well camouflaged and difficult to see.

Construction materials were always the same. A base was built of light twigs and stems running into sides of dark, dried leaves. There was a sparse lining of dry grass and horse hair. A single exception to this was when one nest was given a thick lining of horse hair.

The nest was built quickly, usually in two days, by the hen who added

a few finishing touches over the next three to four days until she laid. The nest was deep and the hen sat well down in it with only her tail sticking out.

Average measurements of the nests were: Outer diameter 4 in (0.10 m); inner diameter $2\frac{3}{4}$ in (0.07 m); outer depth $2\frac{3}{4}$ in; inner depth $1\frac{3}{4}$ in (0.04 m). These match well with Ingels' measurements of wild nests.

The birds always left and approached the nest from below.

The approach was one of extreme caution, particularly with the hen when she was on eggs. She always went to the nest by a low-level, circuitous route, stopping on every twig to look and listen for danger. The cock attacked the other birds present only if they landed on the nesting bush, but otherwise there was no trouble.

Prior to egg-laying the hen avidly ate eggshell. She was seen to eat half a square inch (1.3 cm^2) at one sitting.

Nineteen eggs were laid in nine clutches. The earliest was laid on 7th and 8th March when the daytime temperature in the aviary rose to 64°F (18°C) and fell to about 35°F (2°C) at night. The last clutch of the year was laid in the outside aviary on 6th and 7th September when it was considerably warmer. This last clutch was the only one from which both chicks were reared.

The normal tanager clutch is two but there was one exception when three eggs were laid. Sixteen hatched, the first clutch and one of the above three eggs being infertile.

The egg is pale blue with inky black spots concentrated at the big end. These blotches, up to 1 mm in size, could both be seen and felt to be raised above the blue surface. The size, 17 x 25 mm, was the same as a Hardwicke's *Chloropsis* egg, but the tanager's egg looked bigger and rounder. By coincidence, the hen tanager and hen *chloropsis* weighed within a gram of each other.

Incubation time, as with all small passerines, is 12 days. The first egg of each clutch always hatched in the afternoon of the 12th day between 1 p.m. and 7 p.m., and the second egg hatched early the following morning at exactly 12 days.

The plump chicks had a little dark down on their heads but were soon covered with wispy dark grey down. The gape is blood-red. The feathering and fledging pattern is also common to small passerines. The large black eyes opened at six days, and chicks left the nest at 10 days, when they could only flutter. They are similar in appearance to the non-breeding adult female, but slightly lighter in colour.

Only the hen was seen feeding the chicks for the first three days. She took them wasp larvae, mealworm pupae, spiders and moths. She also used blueberries which had been stored in the freezer. Grasshoppers and

crickets were ignored by both parents, even for their own use.

From three days on, the cock also fed the chicks and in addition to the above-mentioned foods, he conveniently used rice pudding and bread with peanut butter and margarine. He had been feeding the hen on the nest throughout the incubation with all of these items.

Chicks died with exasperating frequency, all between two and seven days old. The causes of death were not determined.

Some fragments of hen eggshell were found in the stomach of a week-old chick.

As already noted, in only one case was the complete clutch fledged. The deaths of other chicks were all the more mysterious, when their nest-mates survived on three occasions.

One chick was kept and it overwintered with the parents. When the adults renested in the spring, the juvenile interfered mildly with the nest-building and was thought to be a hen. It was not molested by either parent. When the young bird was eight months old, all three were sold to the same buyer. I was later told that 'at about 10 months' the young bird moulted into the adult male colour and was dead six weeks later, presumably killed by the old male.

Previous articles on this species in the Avicultural Magazine

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ON SOME NEW COLOUR VARIETIES OF THE BARBARY DOVE

By DEREK GOODWIN

(Petts Wood, Kent)

In 1982 I made an appeal in our magazine for transatlantic readers to enlighten us as to the new colour varieties of the Barbary Dove produced in recent decades in the USA and/or Canada. Alas, either no informed dove addicts read my article (perhaps, horrid thought, no one reads my articles!) or if they did, they remained unmoved by the appeal.

Recently, however, I received from a German friend a copy of *Die Gefiederte Welt*, the excellent German journal on aviculture and cage bird keeping, for May 1987, which contains an article: 'Zuchtformen der Lachtaube' (= Domestic varieties of the Barbary Dove) by Hans-Dieter Fritsch.

From it I learn that in Europe also various new colour varieties of this bird have appeared and been propagated in recent decades, though it appears the initial appearances of some of them are still shrouded in secrecy. I fear my knowledge of colloquial and bird fanciers' German is insufficient for me to attempt a full translation of the article, lest I should give wrong information here and there, so I shall not attempt to do so. The paper is, however, illustrated with what appear to be good colour photographs of a number of the new varieties, so I thought it might be of interest if I describe them here.

There is, of course, the possibility that the colours may not have reproduced perfectly, indeed in one case I think one has not. One, however shows five new coloured birds plus one of the normal (in domestication) pale fawn variety, and as the colour reproduction of this latter bird is good, I assume the others are too. They are as follows:

1) What looks to be a very pale version of the normal fawn with similar red eyes but with a mainly flesh-coloured bill. The neck ring, though very dark, seems not quite so black as on the normal bird. This bird is called 'Eisfarbig' (ice-coloured).

A paler version of this, with head and breast looking almost white but still with the dark neck ring (very striking in contrast) is on the plate showing five others (one the normal fawn bird) which is simply entitled 'Verschiedenfarbige Lachtauben' (differently coloured Barbary Doves).

2) A very similar bird to the above but with a gingery-brown neck ring, entirely flesh-pink bill and a paler upper area in the red iris. It is simply entitled 'Mit braunen Halsring' (with brown collar).

3) What looks in the picture merely a slightly less pale and dingier version of (1) but with paler and greyer primaries. It is named 'Isabellfarbig' (Isabelline).

4) A bird which has the mantle and wing coverts a warm orange-brown, some inner secondaries, scapulars, the upper tail coverts white edged with orange-brown, the primaries and tail white, the head and breast a slightly greyish and very pale fawn, the neck ring *white*, the iris dark and the bill a pale flesh colour. It is named 'Lavendal 1984' (Lavender 1984).

Possibly the photograph does not do it justice as in the illustration of the six birds there is one very similar (it may even be the same bird, taken from the opposite side) but with the head, neck and breast of a pinkish brown that does have a *very* faint lavender or bluish tinge.

Two other similar birds, one in the highest point of the bowing display, are shown face-on in the same photograph. They appear similar but a little paler in colour. Their backs, posterior parts of wings and tails cannot, however, be seen.

These three latter reddish birds have bills (in the photograph) that appear dusky flesh merging to dark brown on the tip of the culmen.

Although the German name for this colour is 'lavender', it appears very similar to 'dominant red', or one type of 'dominant red', in domestic pigeons. And, as with that colour in pigeons, it evidently is linked with suppression of pigment in the normally dark parts of tail and primaries. In the doves also in the normally dark neck ring, which in these birds is white as has been said.

5) A bird is in the picture of the six, which is faced away from the camera and so only upper parts are visible. It is a bright orange-brown on the top of the head, wings and upper surface of the visible tail feathers, rather paler on the nape and darker, almost a reddish chocolate, on the hind neck and upper part of the mantle. It shows some indication of a whitish neck ring but this is interrupted (as in the juvenile, but this bird does not look to be in juvenile plumage) down the middle of the back of the neck.

6) Two blotchy pied birds, the dark parts of their wings and tail appearing in the photograph much darker than the wild colour. They are called 'Tigerschecken dunkel wildfarbig' (Tiger pied dark wild-coloured). They reminded me of some similar pied birds (but with the dark parts of the usual fawn, though looking darker against the white) that the Keston Foreign Bird Farm had about 34 years ago and are, in my eyes, not at all attractive.

So far as one can judge from the photograph, all except the tiger pied birds seem rather attractive, though none more so than the 'old' fawn and

white varieties familiar to us oldsters from our childhood days. It is interesting that the beautiful mauve pink tinge on the breast of the wild bird does not seem to exist in similar intensity in any of these varieties, though I am told that birds of the genuine wild colour can be had in the USA.

I have here described all the birds shown in the colour photos illustrating the article. The author, however, gives a list of the varieties now (apparently) obtainable in Europe, of which I include a translation below. Possibly some of the terms may be comparably euphemistic to the English use of such words as 'blue', 'red', 'opal', etc., when applied to colour varieties of domestic pigeons, or cats. I give a rough and somewhat condensed translation of the table heading, etc., but an exact and literal one of the colours as named by Herr Fritsch.

Summary of the different Barbary Dove mutations, which has, however, no claim to be comprehensive:

Pure white (albinos) with red eyes

Pure white with black eyes

White (partial albinos)

White (partial albinos) with brown neck ring

White with black neck ring (ice-coloured)

Ditto in ivory and silver

'California' ('see photo' but in fact no photo or description of this is given)

Tiger-pied in colours of the whole spectrum

Wild-coloured light/or pink/or also heather-coloured

Isabelline to 'Lachs-' coloured

Wild-coloured to brown, in several gradations

Light wild-coloured orange (I cannot guess what this means!)

Yellow (old term for brownish); (I think this means the usual fawn variety)

Red, orange, yellow, isabelline, lavender and violet, all with white neck ring, sometimes with and sometimes without white tail and sometimes with white 'saddle'

Blue Barbary Doves are not yet firmly established, also black Barbary Doves occur (the author mentions that these black mutants have so far not proved viable)

It is to be hoped, if not expected, that some of my readers will give us further information on the subject, especially on the varieties available in the USA and their exact appearance.

BREEDING THE GREAT INDIAN HORNBILL
Buceros bicornis
AT THE ST. LOUIS ZOOLOGICAL PARK, USA

By **BRUCE W. BOHMKE**
(Curator of Birds)

The St. Louis Zoo has displayed Giant Hornbills for many years. The pair at present on exhibit consists of a male which was added to the collection in 1976 as an adult, and a female purchased in 1983 as an adult. This pair has proved to be very compatible.

The Bird House was constructed at St. Louis Zoo in 1931, and renovated in 1979. The birds are enclosed in exhibits by vertical stainless steel wires which are maintained at a tension of 75 lbs, and are spaced 2.54 cm apart. Walls of exhibits are composed of cement plaster painted a neutral grey colour. Skylights throughout the building create a natural photoperiod. Each exhibit has a pool constructed of cement and stone.

The display originally housing the Hornbills measures 2.8 m x 10.8 m x 3.7 m high. A section of Sycamore Tree *Plantanus occidentalis* constitutes the nest cavity. This log measures 2.18 m tall x 0.90 m in diameter, and the circular opening on the side measures 0.40 m in diameter with the bottom of the entrance hole 0.95 m from the ground. The top of the log is covered with a piece of galvanised sheet metal. The female Hornbill sat in the nest log for long periods of time during the spring of 1985, but she neither laid an egg nor moulted. The size of the entrance hole to the nest seemed to be too large. The male would attempt to pack food and faeces on the edge of the nest hole, but the aperture was too great for the birds to succeed in reducing the size of the hole significantly. The male would occasionally sit with the female in the nest.

In April 1986 the Giant Hornbills were moved to a different exhibit measuring 2.8 x 6 x 3.7 m high. The enclosure included a Sycamore log measuring 2.00 m tall and 0.80 m in diameter. The entrance hole, which is oval-shaped, measures 0.25 cm high x 0.20 cm wide, with the bottom of the entrance hole 1.40 m from the ground. After a short time in the new exhibit the female Hornbill was sealed in the nest log by the male.

The material used to close the hole was a combination of soft fruit faeces and wood shavings. The size of the remaining opening was 0.24 m high x 0.064 m wide. The male fed the female a diet of diced fruit, including apples, bananas, grapes, oranges, and a softbill diet consisting of chopped hard-boiled egg, Bird of Prey diet¹, gamebird chow², trout



St. Louis Zoo

Giant Hornbill Chick, hatched May 1987 at the St. Louis Zoo

chow² and Tune-up Brand Mockingbird mix³. After 102 days the female emerged from the nest. No indication of an egg or chick was discovered but the female had moulted.

In October 1986, both birds were removed from the exhibit and separated. The pair was put back in the same exhibit on 24th February, 1987, the log having been filled with shredded oak bark to within 10 cm of the bottom of the entrance hole. In the first week of March the male Hornbill began to pack material around the sides of the nest hole. The female first joined the male in this activity on 15th March and was seen inside the nest log on 18th March. By 3rd April the female Hornbill was sealed in the nest.

On 27th May, after the female had been in the nest log for 55 days, a high-pitched begging call was heard by the keeper. The begging chick was heard daily from then on, and on 9th June 1987, the young bird was first seen through the feeding hole with the aid of a torch. The chick appeared to be the size of a small bantam hen and was covered with white down. Both the male and female were quite aggressive. On 21st June, the chick's beak was seen at the feeding hole begging directly from the male. The chick and the female emerged from the nest within the same hour on the morning of 5th August. The female had moulted while confined in the

nest.

The adult hornbill diet was modified for the 1987 season by adding cooked diced carrots, canned corn, cooked diced beets, and canned black-eyed peas to the fruit mix. The softbill mix was switched to a commercial preparation called Soft-billed Bird Diet, manufactured by Reliable Protein Corporation⁴. When the bird's begging was first heard, crickets, newborn and adult mice were added to the diet and these items were selected to be fed first by the male.

When the chick emerged, it was slightly smaller than the female, but very similar in appearance. Of course, the chick has no casque but it does appear to have a small erectile crest on the top of the head where the casque will be. This is particularly noticeable when the chick is excited. The chick still begs from the adult to receive food four weeks after leaving the nest log.

The history of Giant Hornbills breeding in captivity has been sporadic. A number of changes were made in the husbandry of our Hornbills including diet, nest log and exhibit. We hope that the chick produced in 1987 is an indication that we are beginning to provide the essential ingredients for successful reproduction.

Products mentioned in the text:

1. Bird of Prey Diet. Animal Spectrum, Inc., 5801 Locust, Lincoln, Nebraska 68516.
2. Gamebird Chow & Trout Chow. Ralston-purina, General Office, Checkerboard Square, St. Louis, Missouri 63104.
3. Tune-Up Brand Mockingbird Food. United Pacific Mill, 201 S. Cactus Avenue, Rialto, California 92376.
4. Soft-billed Bird Diet. Reliable Protein, 3960 Laurel Canyon, Suite 447, Studio City, California 91604.

* * *

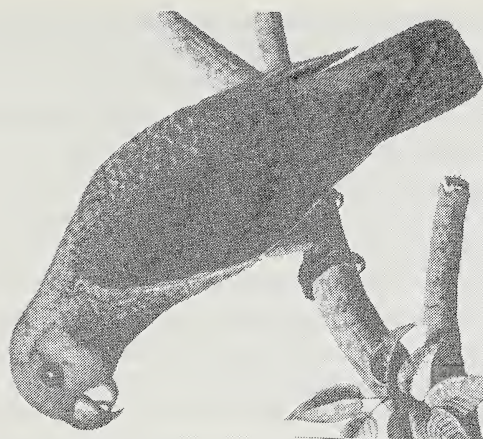
THREE *POICEPHALUS* PARROTS IN CAPTIVITY AND IN THE WILD

By NEVILLE BRICKELL

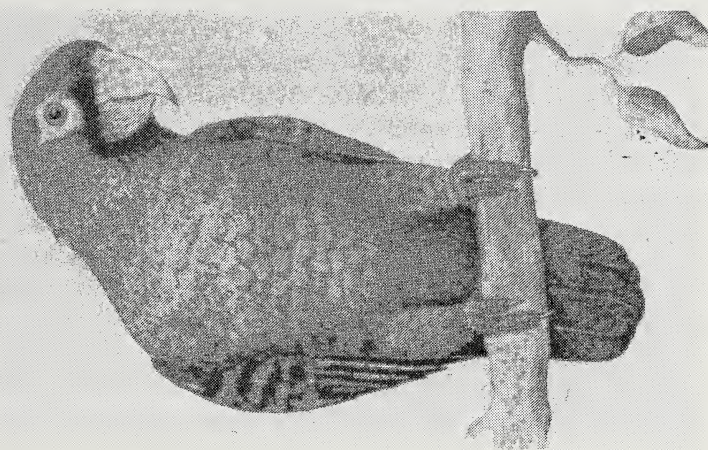
(Avicultural Research Unit, Republic of South Africa)

The Yellow-faced Parrot *Poicephalus flavifrons* is also known as the Yellow-fronted Parrot and Shoa Parrot. The sexes are similar and measure 26-28 cm in length. The general plumage colour is green; the forehead, crown, around eyes and upper cheeks yellow; in some birds a touch of yellow on the thighs and edge of wings is visible; the nape, mantle, back and wings are green; the primaries are dark green, tipped with greenish brown; the tail greenish black; the iris orange-red; the bill and upper mandible are greyish black, the lower mandible greyish white; the legs and toes are blackish grey. *P.f. aurantiiceps* differs from the nominate race in having orange on the forehead, cheeks and ear-coverts in place of yellow. Immatures have the crown and upper cheeks yellowish olive. The nominate race occurs in the northern and central regions of Ethiopia, as far west as the Gurafarda Mountains. *P.f. aurantiiceps* is known from the Gila River area in Illubabor Province, in the south-western highlands of Ethiopia. It probably integrates eastwards with *flavifrons*. It occurs in Hagenia forests at an altitude of about 1,000-3,000 m.

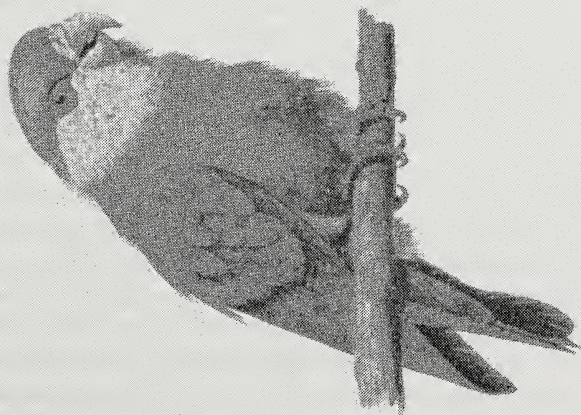
The Senegal Parrot *Poicephalus senegalus* has been given alternative names such as the Yellow-bellied Senegal Parrot and Yellow-vented Senegal Parrot. *P.s. versteri* is known as the Scarlet-bellied or Red-vented Senegal Parrot and *P.s. mesotypus* as the Orange-bellied or Kano Yellow-vented Senegal Parrot. Their length is between 23-24 cm and the sexes are similar. The crown, nape, chin and throat are blackish grey; the cheeks, sides of face and ear-coverts are silvery grey; the upper breast, mantle, back, scapulars and wing-coverts are bright grass green; the lower breast and abdomen are yellow, tinged with orange; the primaries blackish brown with outer webs washed with green; the under wing-coverts and under tail-coverts yellow; the tail is brown washed with olive; the iris yellow; the bill, legs and toes blackish grey. *P.s. versteri* differs from the nominate race in having the abdomen red; the upperparts deeper green. *P.s. mesotypus* differs in that the green of the upperparts and breast is paler and the abdomen orange. *P.s. senegalus* is found in West Africa, from Senegal, Gambia, southern Mali and Guinea including the Los Islands. *P.s. versteri* ranges from the Ivory Coast, Ghana, Togo, Benin and north-western Nigeria. *P.s. mesotypus* occurs in eastern and north-eastern Nigeria, northern Cameroon and south-western Chad. This species inhabits open forest,



Yellow-faced Parrot



Jardine's Parrot



Senegal Parrot

These three plates are reproduced by kind permission of the artist, Rex M. Shirley

preferring those where the Baobab *Adansonia digitata* lives (a grotesquely fat tree, about 10-15 m in height, the bole in large specimens being about 28 m in circumference). It also inhabits the Borassus Palm (massive fan palms with dark grey trunks and stiff crowns of greyish green leaves) and the Locust-bean Tree *Parkia filicoidea*.

Poicephalus gulielmi is usually known as Jardine's Parrot, with alternatives given as the Red-crowned Parrot, Red-headed Parrot and Congo Red-crowned Parrot. *P.g. fantiensis* is known as the Fantee or Gold Coast Orange-crowned Parrot, *P.g. massaicus* as the Masai Red-headed Parrot and *P.g. permistus* as the Eldoma Red-headed Parrot. The sexes are alike with a length of 28 cm. The plumage is mainly dark green; the forehead, crown, bend and lower edge of wings and thighs orange-red; the lores are blackish; the mantle, back and scapulars blackish brown, each feather edged with green; the rump yellowish green; the primaries, secondaries and tail are blackish; the iris reddish brown; orbital ring pinkish white; the bill, upper mandible is whitish, the lower mandible blackish; the legs and toes are greyish brown. *P.g. fantiensis* differs from the nominate race in having the forehead, crown and the edges of the wings orange instead of orange-red. *P.g. massaicus* is paler than the nominate race with the rump and upper-tail coverts lighter and more yellowish green; the mantle, back and scapulars are more brownish, less blackish and there is less orange-red on the forehead and crown. *P.g. permistus* is a doubtful subspecies which is said to be intermediate between *gulielmi* and *massaicus*. Immatures are paler and lack the orange-red on the forehead, edge of wings and thighs. The range of the nominate race is southern Cameroon and Central African Republic to northern Angola; *P.g. fantiensis* is found in Cameroon, Benin, Ghana to Liberia. *P.g. massaicus* is a local common resident occurring at 1800-3250 m in the highland forests of southern Kenya and north-eastern Tanzania from Mt. Elgon, the Cheranganis, Elgeyu, Mt. Kenya, parts of the Crater Highlands and Mt. Kilimanjaro. *P.g. permistus* is confined to the highlands of Kenya except in the south. It inhabits the *Podocarpus* forests of Tanzania and Kenya, and tall trees adjacent to coffee plantations in Angola. It has been recorded as living up to about 3,500 m where it appears to be scarce in the west.

Yellow-faced Parrots have been observed in small flocks of 15-20 birds, often in the company of Abyssinian Lovebirds *Agapornis taranta*. It is reported to raid cultivated lands belonging to African tribesmen to take their grain and millet in season. Fruit and seeds are procured from forest trees, the parrots being partial to the ovoid fruit of the Baobab - these are about 12 cm in length, with a hard woody shell, covered with yellowish grey, velvety hairs. Nothing is known of this parrot's nesting habits but it

is suspected that the site is a tree hole. I can find no records of this species having been bred in aviaries anywhere in Africa. A pair that were kept for some years in the aviaries of Mr. Herbert Whitley of Paignton, England, also failed to breed.

The Senegal Parrot is usually observed in noisy flocks of up to 20 birds, but in pairs during the breeding season. Occasionally a lone bird may be seen. They are shy, wary birds and therefore difficult to approach. In flight they are very conspicuous with their striking yellow underparts as they fly swiftly with rapid wing beats. They feed on fruits, seeds and leaf buds of indigenous trees. Raiding parties visit cultivated areas to feed on maize, millet and groundnuts. They have been recorded feeding on the fruit of *Murula Sclerocarya caffra* (globose to ovoid, soft, slimy pulp; seeds nut-like, white), the seeds of the Ana Tree *Acacia albida* (pods contorted and curved, initially green, later red blotches when mature), the fruit of Small Sourplum *Ximenia americana* (oval, yellow to red when ripe, rather sour but refreshing), Mahogany *Khaya senegalensis* (capsule woody, about 3-5 cm in diameter, splitting neatly into four to five valves; seeds winged), Dinya *Vitex cienkowski* (fruit glabrous, oblong-ellipsoid, $\frac{3}{4}$ in long, black when ripe, sweet and edible), Madobia *Pterocarpus erinaceus*, Shea Butter Trees *Butyrospermum parkii* and *Sclerocarya birroea* and young buds of the Kassia tree.

In captivity these birds will accept a basic diet of two parts white or striped sunflower, plus one part each of white millet, buckwheat and canary seed. This may be supplemented with pine nuts, ground nut kernels, grapes, apple, soft pear, orange, banana, figs and dried raisins and sultanas. They are partial to millet sprays. Suitable green food includes spinach, beet, celery, grated carrot and sprouted oats, sunflower and canary seeds. As rearing food a mixture of soaked seed, boiled potato, sponge cake, cheese, bread and butter pudding, bread and milk, corn-on-the cob (maize) and hard-boiled egg is quite adequate.

Recorded breeding is in November (Senegal), from September onwards elsewhere. A nest was found which contained two nestlings, one double the size of the other with pin feathers visible on the head, wings and signs of orange appearing on the breast; the other was well covered with grey down. Nests in tree holes with the Baobab being a known site most favoured. The three to four eggs are white, glossy with a single egg measurement of 29.4 x 26.4 mm. The eggs are incubated by the female for 27-29 days, the male feeding her at the nest, and also helping to feed the nestlings from the time of hatching until they become independent at 63-71 days. At the Scarlet Tanager Bird Park, South Africa, it was found that during spells of cold weather, incubation took 25 days and on normal hot days, 22 days were recorded (pers. comm. King, 1978).

The Jardine's Parrot is a shy, wary bird which is seldom heard while feeding, but in flight constantly utters high pitched screeching. Flight is swift and direct, performed with rapid wing strokes. It is a social species, being found in small parties of up to ten birds, with larger flocks occurring when food is plentiful. This parrot feeds on seeds, nuts, fruit and berries and the contents of one stomach revealed pieces of a few insects. They have been observed feeding in the company of Sharpe's Starlings *Pholia sharpii* and Rameron Pigeons *Columba arquatrix*. It has been recorded feeding on the flowers or seeds of the Australian Silver Oak *Grevillea robusta* (showy golden orange flower spikes appear in spring and are rich in nectar), the pods of *Spathodea* spp. (a genus of two or three evergreen trees native to tropical Africa), *Podocarpus* spp. (yellow wood family), *Cedrus* spp. (cypress family), including wild olives and oil palm nuts. Captive birds will accept a similar diet to Senegals with additional greens in the form of watercress, peas in the pod, broccoli and young cabbage stalks; fruit including guava, paw-paw, mulberries and litchees; soft food extras, namely toast crusts, trifle, boiled rice, moistened dog cubes, putu yoghurt, crushed or grated coconut and breakfast cereals. A survey has revealed that the Senegal and Jardine's Parrots will accept the following fruits:

Jackfruit	<i>Artocarpus integrifolia</i>
Breadfruit	<i>A. incisus</i>
Custard Apple	<i>Annona reticulata</i>
Kiwi Fruit	<i>Actinidia chinensis</i>
Pomegranate	<i>Punica granatum</i>
Star Apple	<i>Chrysophyllum cainito</i>
Climbing Raisin	<i>Grewia caffra</i>
Bird Plum	<i>Berchemia discolor</i>
Sand Jackalberry	<i>Diospyros batocana</i>
Nana Berry	<i>Rhus dentata</i>
African Cranberry	<i>Vaccinium exul</i>
Giant Raisin	<i>Grewia hexamita</i>
Tree Strawberry	<i>Cephalanthus natalensis</i>
White-berry Bush	<i>Securinega virosa</i>
Waterberry	<i>Syzygium guineense</i>
Green Monkey Orange	<i>Strychnos spinosa</i>
Live-long	<i>Lannea discolor</i>
Tassel Berry	<i>Antidesma venosum</i>

The Jardine's Parrot has been recorded breeding in June, October and November and appears to continue to February or March. Eighteen nests were investigated during the breeding season in 1971-72 and were found

in natural hollows of live trees; 13 nests were in Muhonde *Hagenia abyssinica* trees (crown rounded or umbrella-shaped, bark red-brown flaking raggedly), four in *Podocarpus* and one in *Juniper* (evergreen, dioecious timber trees attaining 120 ft in height. The two to four white eggs are incubated for 26-28 days by the female only, but this is a point much debated by aviculturists due to males feeding at the nest and spending long periods in the nest-box.

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* * *

OF CRESTED BARBETS AND RED-FACED COLIES

By LOUISE REID HENRY

(Westray, Scotland)

Many members of the Avicultural Society knew my late husband, David Reid Henry, who was a familiar figure at social meetings. He was known to many more members for the numerous coloured plates that he painted for the *Avicultural Magazine* and the regular articles that he contributed between 1956 and 1971. He was acknowledged to be one of the world's greatest painters of birds, particularly raptors, but his life was cut tragically short by illness in 1977, at the age of 58.

After our marriage in 1976 David and I established an aviary in the garden of our house in Zimbabwe, the object being to provide models for David's paintings.

We filled the aviary with various birds that came into our hands, 'window bashers', road traffic accidents and other casualties. If the birds recovered and were happy in captivity, they remained with us. Others which clearly did not appreciate the restrictions on their freedom were released if they were well enough, once they had paid the rent by posing for David to sketch them.

We acquired two Crested Barbets, I forget the circumstances, the cock clearly distinguishable by his heavier bill, though they were otherwise identical. They settled down quickly and happily and adapted easily to the diet we provided: chopped ox heart mixed with a high protein flaky baby food called Pro Nutro, mixed with some fresh fruit.

One quiet Sunday afternoon there was a great commotion at the aviary. A wild cock Barbet turned up and he and our aviary cock were 'churring' away at each other, trying to clutch each other through the wire and displaying in a way that we had not observed before. Instead of the crest being further erected, it was depressed flat, as were the feathers of the upper part of the body, but the feathers of the legs and under the tail were fluffed out so that each bird resembled nothing so much as a highly coloured and highly agitated shuttlecock. The hen observed these antics with some interest but after 20 minutes or so, the wild cock despaired of achieving anything and flew away. The performance was repeated several times on subsequent days, then everything settled down again and our pair resumed their normal existence.

Some time previously we had provided a hollow log. The barbets were very interested in it and investigated it thoroughly but did not appear to be using it to rear a family.

During the two or three weeks following the visit of the wild Barbet, both our birds were active and visible throughout the day, though we thought that one or both of them roosted inside the log at night.

Then one day we heard a quiet but unmistakable 'churring' sound coming from the log. Both Barbets were visible as usual in the aviary and obviously not responsible for the sound. When we fed them, the hen disappeared into the hole with food in her beak. I caught a live cricket and offered it and she took it, after a little hesitation, from my fingers and delivered it to the nest hole.

Ten days later, a face appeared at the hole, looking out from inside and a few hours later, we had three Barbets in our aviary, then four, and five. The young were fully feathered and almost fully coloured, and, apart from their short tails, were not much different from the parents.

The breeding season in Zimbabwe is not so precise as in Europe. If food is plentiful the breeding season will be extended. During the 12 or 14 months that we kept this pair, they reared five families. Certainly neither bird ever sat on eggs during the day, though almost certainly they both stayed in the nest-hole at night.

When the chicks were being fed, I made a special effort to provide live food which was obviously greatly appreciated. Once the chicks were fledged the hen was no longer especially interested, certainly not to the extent that she would take food from my fingers.

One day when I was gardening she clung to the wire and fixed me with her beady little eye. I received the message, quickly pounced on a live cricket, offered it to her and off she went to the nest hole. This early evidence of hatching occurred four or five days before the 'churring' became audible.

We never saw any evidence of the chicks' droppings. The parents were never seen removing them from the nest and when I eventually dismantled the nest hole, it was perfectly clean, so the sanitary arrangements remain a mystery.

The Barbets were the most attractive and entertaining inhabitants of our little aviary and despite being wild birds they settled down well. They were always busy but were quite undistressed by confinement. Although active, bold and inquisitive, they were not aggressive to other, smaller birds. The hen, as I have described, very easily overcame the barriers of species and language when she wished to communicate her wishes to me. The cock bird fed the chicks too, but with less dedication and he never took food from my fingers. Once, while proffering a rather small insect to the hen, she accidentally gave me a painful nip and I received a very real impression of the power of her beak. It felt as though she could crack Brazil nuts if she wanted to.

One of the chicks had a much larger amount of red on its plumage than the others. This raised in my mind the possibility of breeding colour variations of this attractive bird but David disapproved strongly of breeding 'abnormal' birds; to him the most attractive, in fact the only acceptable colour pattern was that which was typical of the species, so my little red chick was released to the wild as soon as he was considered to be self-supporting.

There seems no reason why these attractive birds should not breed as easily in Europe, provided that the aviary is heated, and it is recognised that neither bird broods the eggs, at least during the day. Obviously, mealworms would be appreciated while the chicks are being fed.

The quaintest birds I have ever kept were Red-faced Mousebirds or Colies. I inherited a pair from a little girl who had brought them up from about a week old. To say they were tame was the understatement of the year. I released them once at a ladies' teaparty. The pair flew from hair style to hairstyle, gently tweaking the curls. The tea was brought in, they had dust baths in the sugar basin. Guessing what was to come next, I warned my friends to cover their cups of hot tea with a hand or saucer. As soon as it was cool enough the guards were removed and my two Mousebirds dived in, like sparrows in the bird bath, balancing on the tea cups, flirting their wings and fluffing their feathers, returning to the hairstyles to dry out. My friends are very tolerant, and anyone who is not likely to be fascinated and entertained by this performance has no place in my circle.

This is the ideal household bird and so suitable as a child's pet. Handled gently it will lie on its back in the palm of the hand and appears to delight in human company. But nothing is perfect in this world. Their favourite diet is soft fruit which in Zimbabwe means avocado, banana or pawpaw. They will devour piles of these fruits and not more than 15 minutes later, it all appears again at the other end, still recognisable as avocado, banana or pawpaw. So a period of abstinence of an hour or so was necessary before demonstrating their teatime tricks. The cage needs to be cleaned twice a day, the sodden newspapers make excellent compost. One day, when the pawpaw and avocados hung heavy on the trees, I accidentally allowed the Mousebirds to escape. But they remain in my memory as the most utterly tame and trusting of all the wild creatures that have ever shared my life.

BRITISH SOFTBILL IMPORTS — SOME OBSERVATIONS

PART I: CORVIDAE TO COEREBOIDAE

By JEFFREY TROLLOPE
(Hounslow, Middlesex)

During this last decade the numbers of foreign birds and species imported into the UK has been drastically reduced. This is largely due to the introduction of quarantine and the control of the numbers imported, and has resulted in a much needed improvement in shipping and reception standards. I believe that few aviculturists, if any, will regret the demise of unrestricted bird importation. However, the last four to five years have seen a welcome return of small numbers of species which were once frequently available. These imports included a few species which have probably not been imported before, especially during 1985/86.

Softbill enthusiasts have taken advantage of these opportunities and have added to the list of species bred in captivity.

For many reasons bird importations have always been erratic and unpredictable. Currently some of the major factors affecting foreign bird availability make a long list. Restrictions imposed by the importing countries, political, economic and agricultural conditions in the countries of origin, the economics of civil aviation and the public perception of aviculture in the importing countries, to mention a few. Therefore, the present availability of many species will probably be short lived. In addition to 'first breedings' an opportunity now exists for the more frequently imported species to be established in aviculture.

As demonstrated by articles in this magazine and in other avicultural literature, there appears to have been an encouraging increase in the number of successful breedings in recent years. These have included zosterops, bulbuls, starlings, barbets, babblers and tanagers, among the more frequently imported bird families.

The following three part lists, are intended to give a limited indication of some of the species imported in recent years. They are headed under bird families, obviously with many omissions and I have followed a reversed order of Clements Checklist (1981). Those species which have probably not been imported before 1980 are identified by an asterisk. Reference sources will be given at the end of Part 3.

Corvidae - Crows and Jays

Old World species recently available here have included Rufous, Grey and Collared Tree Pies *Dendrocitta*. The Green Magpie or Hunting Cissa,

Blue Magpie *Urocissa* and Azure-winged Magpie *Cyanopica* were formerly imported fairly frequently.

The African Piapiac *Ptilostomus afer* has seldom been seen in aviculture and probably because of its all black plumage the bird would not be a choice for the exporters.

New World species have been represented by the Green, Pileated and Plush-capped Jays *Cyanocorax*, and Yucatan and San Blas Jays *Cissilopha*.

Dicruridae - Drongos

Drongos have never been popular avicultural subjects; the Greater and Lesser Racket-tailed *Dicrurus remifer* and the African Square-tailed *D. ludwigii* have been listed in recent years.

Oriolidae - Orioles

A few African Golden Orioles *O. auratus* and Asiatic Black-hooded *O. xanthornus* have been imported. It is interesting to note that apparently no oriole species have been bred in the U.K.

Sturnidae - Starlings

Acridotheres species, once frequently imported, have been available. These have included the Bank, Common, Jungle, Collared and Crested Mynahs; also Hill Mynahs *Gracula religiosa*, Asiatic Glossy Starlings *Aplonis* sp. and many *Sturnus* species. The Asian Pied, Jerdon's, Black-collared, White-cheeked, Black-winged, White-shouldered, Brahminy and Rose-coloured starlings. Unusual species listed are the Coledo Mynah *Sarcops calvus*, the Yellow-faced Myna *Mino dumontii* and the Golden-crested *Ampeliceps coronatus*. A species seldom imported before 1980 is the Grosbeak Starling *Scissirostrum dubium*, also a first UK breeding (Peck, 1985). The Celebes Magpie* or Buton Starling *Streptocitta albigollis* is probably a first importation and breeding (Ridgeway, 1984).

African starlings have been well represented recently, especially those in the genus *Lamprolornis*. Among those listed have been the frequently imported Green and Glossy, Purple and Purple-headed and Long-tailed. Less often seen have been the Splendid, Meves and Emerald. Other genera have included *Spreo* Superb, Chestnut-bellied *Cosmopsarus*, Regal and the Violet-backed (Amethyst) Starling *Cinnyricinclus*.

Coerebidae - Honeycreepers

Cyanerpes species, once frequently imported, have been recently listed as the Purple and Red-legged. The monotypic Green *Chlorophanes spiza*

and Bananaquits *Coereba flaveola* have also been available.

To be continued in a future issue

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NEWS AND VIEWS

From Fred Barnicoat (South Africa)

The South African National Cage Bird Association's National Show and Conference for 1987 were held in East London in July. Over 500 indigenous and exotic birds were exhibited in addition to two and a half thousand Canaries and Budgerigars. This exhibition was characterised by the preponderance of the more easily kept and bred species, especially the Australian finches, the Gouldians and Zebra Finches in the latest mutant forms being of a particularly high standard. The Eastern Cape is a stronghold of mule and hybrid breeding, but in this Show there was an apparent dearth of parrot-like, soft-billed and the rarer and more unusual species. Therefore the unusual situation arose in which the supreme award went to a pair of Cut-throats of the nominate race *Amadina f. fasciata* from West Africa. They were particularly clear of markings on the upper breast and the abdominal chestnut patch showed up well, so that they contrasted nicely with our indigenous subspecies from further south, *Amadina f. meridionalis* with its heavy scalloping and duller appearance, seven examples of which were benched in the South African Bird Section.

The medal for the meritorious breeding of the year for 1987 was awarded to E.A. Clewlow (Durban) for rearing two Grosbeak or Moluccan Starlings *Scissirostrum dubium*. They nested in a budgerigar nest-box in the aviary shelter, using leaves, straw and paper to construct the nest. Two eggs, blue with brown spots, were laid. Both hatched and the chicks were reared mainly on an almost unlimited supply of flying ants, collected after rain, and refrigerated to ensure a continuous supply. Two subsequent broods were lost, there being no supply of these flying ants available.

Other officially verified breedings included one Yellow-billed Hornbill *Lophoceros flavirostris*, reared in a sisal stump; the parents only partially sealing the entrance with mud. The diet used was minced ox-heart, soaked dog biscuit, crushed maize, sunflower seed and diced fresh fruit.

Two Knysna Louries (Touracos) *Turacus corythaix* were reared in a nest that the parents built of pine needles and green grass shoots in a

shallow wooden tomato box. The feeding was similar to that used for the Yellow-billed Hornbills above, excluding the ox heart and seeds.

Two Five-coloured or Chestnut and White Munias *Lonchura quincolor* were bred in a nest of grass woven in a clump of dry bush. The parents fed on egg food, fruit flies and mealworms in addition to the usual seeds. This species was first imported into South Africa in 1980 but has proved generally rather wild in aviaries and not easily bred. However, in addition to the above-mentioned success, they were also bred in Cape Town in 1987. Other successes included two Grey-headed Munias *Lonchura caniceps* from south-eastern New Guinea, one Black-headed Siskin *Carduelis notatus* - also reported breeding well in Cape Town, and one Musschenbroek's Lorikeet *Neopsittacus musschenbroekii*.

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From Neville Brickell (Natal Avicultural Society, South Africa)

Our records showed that when breeding, the incubation was shared by both sexes in a pair of White-throated Canaries *Serinus albogularis* (Vol. 91 1985, No. 4, pp. 217-221). A second observation of the same pair by the Avicultural Research Unit has revealed that the male would stand over the eggs with drooped wings, but he was not observed to sit tight when the female vacated the nest for short periods. Popular reference states that *Serinus* species are only incubated by females. This behaviour may arise from the fact that Streaky-headed Canaries *S. gularis* are known to peck the eggs in exposed nests. Two pairs of these birds were housed in the same aviary as the White-breasted Canaries.

* * *

Derek Goodwin writes that his last Blue-headed Cordon Bleu has died at 13 years and four months old (calculated from fledging date, 25th August 1973 to 23rd December 1986). Is this a record?

* * *

From David Coles:

Five captive-bred Thick-billed Parrots *Rhynchopsitta pachyrhyncha* from Jersey Zoo have been flown to the U.S.A. as part of a reintroduction project by the U.S. Fish and Wildlife Service, Arizona Game and Fish Department, the U.S. Forest Service and the San Diego Zoo. Successful pilot releases of confiscated wild-caught birds have already been undertaken and it is hoped that captive-bred birds will form the basis of future

releases. Although found only in the north and central regions of Mexico, its former range included Arizona and New Mexico in the U.S.A.

It seems that Taiwan is fast becoming an area of importance for aviculturists, ornithologists and protectionists alike. The export of endemic species such as Steere's Babbler *Liocichla steerii*, the Formosan Yuhina *Yuhina brunneiceps* and Yellow Tit *Parus holsti* is causing concern as reduction in numbers is becoming more noticeable in certain areas.

Whatever branch of aviculture you specialise in, the Mandarin Duck *Aix galericulata* is a familiar bird. Rather surprisingly, this species is now becoming a rare species in its native China and Japan. The Chinese population may be as low as 500, while that of Japan has decreased by 3,000 in the past four years and now stands at between 8-9,000. The feral population in England is believed to be 850-1,000 pairs in 750 locations.

The California Condor *Gymnogyps californianus* is extinct in the wild. The last free specimen was captured on 19th April 1987 to join the 26 others held in captivity at San Diego Wild Animal Park and Los Angeles Zoo. The species has yet to breed in captivity but courtship behaviour has been reported recently at San Diego Zoo.

The Spix's Macaw *Cyanopsitta spixii* from eastern Brazil is one of the world's rarest birds but last year two young were taken from the only known nest of this gravely endangered species whose wild population is believed to be as low as six individuals. The illegally-taken young were seized after undercover operations by members of several protection organisations. The birds were destined for West Germany and were valued at £13,000 each. Both are now housed in Sao Paulo Zoo.

The Diamond Firetail *Emblema guttata* is the most familiar of the five members of this genus. Of the others, the Beautiful *E. bella* and Red-eared *E. oculata* have not been seen in European aviaries in recent times, although 20 of the latter were imported into Switzerland in 1970. In Australian aviaries both are kept but not very commonly. Exact numbers are difficult to state but as all indigenous birds have to be registered, it is known that neither of the two are held in South Australia. In New South Wales, five *bella* and 96 *oculata* are legally registered.

Since the rediscovery of the Gurney's Pitta *Pitta gurneyi* in Thailand, a further two males have been seen within the area of the original sighting.

REVIEWS

INTRODUCTION TO SOUTHERN AFRICAN CAGE AND AVIARY BIRDS. VOLUME I: SEED EATING BIRDS.

Compiled by Neville Brickell. Illustrated by Rex M. Shirley. Published by Nadine Publishers, P.O. Box 83492, South Hills 2136, Republic of South Africa. 1986, ISBN 0 620 09899 6. Twenty-three coloured plates, numerous black and white illustrations, maps, etc. Paperback. In the U.K. available from Messrs. Wheldon and Wesley, Lytton Lodge, Codicote, Hitchin, Herts., SG4 8TE.

Upon opening a book, invariably the first thing I do is look at the pictures. This present book was no exception and, instead of the all too usual selection of pictures of common seed-eaters, it was refreshing to find good coloured photographs of several species with which I am largely unfamiliar and, so I suspect, are many other members. I have in mind particularly the coloured photographs of the recently-discovered Lemon-breasted Canary, the Cape Siskin, Forest Canary, Pink-throated Twin-spot, Cape and Cabanis' Buntings and the Damara Black-headed Canary, a race of the rather better known nominate form, sometimes called the Alario Finch.

There are coloured photographs of more familiar species, among them the gorgeous Violet-eared Waxbill, Melba Finch and Blue Waxbill. Almost without exception, the photographs are of a high standard. Most are the work of Neville Brickell (whom members will know as a regular contributor to the *Avicultural Magazine*); the remainder are by Stuart Shillinglaw. In addition, there are numerous excellent black and white illustrations. At first I was puzzled by their unusual photographic quality, until enquiries revealed that they were made from enlarged photographs, which were touched-up with pen and brush by Rex Shirley, then specially reduced down for reproduction in this book.

As well as the 23 coloured photographs inside, a male Taha Weaver (Golden Bishop) in full breeding plumage adorns the front cover and a fine portrait of a Black-eared Canary fills the entire back cover. In addition to the birds, there are other illustrations and distribution maps.

Southern Africa is taken to be approximately the southern third of that continent; it includes the Republic, Namibia, Botswana, Zimbabwe and Mozambique. According to my reckoning, this present volume covers 66 species, or 67 if, as in South Africa, Dufresne's and the Yellow-bellied Waxbills (called in South Africa the Swee Waxbill and East African Swee) are treated as separate species. Included are the typical Waxbills, Pytilias, Firefinches, Twinspots, a Crimsonwing, a Seedcracker, Manni-

kins, Whydahs, Widow-birds, Weavers/Bishops (genus *Euplectes*), Queleas and Buntings.

Several pages are devoted to general care and in most instances there is a page or slightly more of information about each species. Set out under separate headings, this includes the Afrikaans name, alternative English names, a description of the species and any southern African races, their range there, details of each species' habitat, diet, then nesting, followed by a sentence or two about their habits/behaviour, under the heading 'Behavioural/Characteristics'.

The information about their diets pertains mainly to southern Africa. Of wider interest is the information about nesting, giving as it does details of the nests, eggs, incubation and nestling periods, etc. The information regarding each species' habits/behaviour can in some instances help to provide a better understanding of their aviary requirements.

Included in the final part of this book are lists of hybrids, places in southern Africa of interest to bird-keepers (public collections, etc.), clubs and associations and considerable detail about the laws relating to keeping wild birds in the different parts of southern Africa.

M.E.

THE PRESIDENT'S GARDEN PARTY - 1987

On 6th September 1987, Avicultural Society members and their guests assembled once again at Chestnut Lodge, Cobham, Surrey, to see the collection of Miss Ruth Ezra and Mr. Raymond Sawyer. As Miss Ezra was elected President of this Society last year, this annual event can now be referred to as 'The President's Garden Party', as in the days when members used to visit her father's collection at Foxwarren Park. (Mr. Alfred Ezra was President of the Society from 1926 until 1955).

One normally thinks of the Chestnut Lodge collection as bathed in sunshine. However, on this occasion we had to shelter until the rain eased off. While waiting, visitors were able to watch a dozen Caribbean Flamingos wading, honking and quarrelling in the pond which they share with a variety of waterfowl, including Hooded Mergansers, Baikal Teal, Eiders, Pacific Brent and Red-breasted Geese. A Blonde Carolina drake in full plumage gave some their first sight of this attractive mutation. On closer inspection of the pond, a Red-eared Terrapin the size of a small frying

pan was seen to poke its head out of the water, apparently decide it was not sunbathing weather, and retire again to the depths. On previous visits a number of these animals had been in evidence, sunning themselves around the edge of the water.

Eventually the rain stopped, and Mr. Sawyer conducted us round the gardens. Crossing the lawn, we encountered Peruvian Thick-knees (a paler and even wider-eyed edition of our native Stone Curlew), Oystercatchers, East African Crowned and Demoiselle Cranes. A Golden Pheasant cock added colour, and there was a family group of Buff Japanese Bantams - apparently these are too short in the leg to scratch up flower beds.

At the far end of the main garden we were conducted into a paddock containing Muntjac, white and normally coloured wallabies, in addition to the egg-laying pair of Stanley Cranes. An aggressive single male Stanley was in a further paddock, covered in netting, which was shared with Indian Blue Peafowl and Welsummer fowls, leaving the wallabies, we passed a block of aviaries housing Perfect Lorikeets, Stella's and Dusky Lories. A group of Scarlet Ibis in immature plumage had been noted in 1986, and they were seen again now in full adult colour as we approached the Gazelle Enclosure. The male Arabian Gazelle had been joined by a female which at first appeared engagingly tame and friendly, letting herself be stroked and petted by everyone. However, her interest in people was later extended to creeping up and gently butting them from behind. A female Arabian Gazelle has sharply pointed horns, and these attentions were received with less enthusiasm. Also in this area were a pair of Maras (Patagonian Cavies) with two young, pairs of Orinoco and Red-breasted Geese, and another pair of Peruvian Thick-Knees. We were privileged to meet the group of Aldabra Giant Tortoises, inside their heated house where they were avoiding the English summer.

A range of aviaries in the above enclosure contained a magnificent breeding pair of Green Junglefowl, White-collared Butan Mynas and the Blackbird-sized South American Yellow Grosbeaks, with huge bills appropriate to their enormous (for a 'finch') size. A pair of Blacksmith Plovers seemed to be objecting to a cock Satyr Tragopan in the adjoining aviary, while ignoring a hen Satyr and some Hill Partridges in their own compartment.

Retracing our steps past the flamingos on our right and the breeding group of Keas on our left, we came to the first waders' aviary, housing Ruffs and a Redshank among others. A Virginian Cardinal was much in evidence, and a Sun Bittern posed elegantly in a small pond.

Moving on to the walled garden, the first aviary held a species that has only recently become available after an absence of several years, the Azure-winged Magpie, here represented by a group with several fledged young.

Congo Peafowl occupied the aviary floor; though sometimes treated as tropical house subjects, they always look very fit out of doors at Cobham. The next aviary contained a pair of Grey-winged Trumpeters, one of which was parading around with a large stick in its beak. The Violaceous Touracos housed with them have again reared young this year.

A fine trio of Bearded Barbets was very active in the lofty outside enclosure attached to the tortoise house, although most of the tropical tortoises had remained indoors. Various sunbirds were in fine condition though elusive in the well-planted tropical house. Smaller aviaries nearby contained Cuban Finches (young reared this year), Golden Heart Doves (sitting on eggs), Blue and White Flycatchers and the enchanting Black-crested Jays, among others.

Our tour of inspection terminated in perhaps the most attractive part of the grounds, at the rear of the house, where several large, well-planted and watered aviaries are grouped around two formal ornamental ponds, the latter containing large fancy Goldfish and Golden Orfe respectively. Koi Carp were to be seen in one of the ponds in the aviary that houses one of the gems of the collection, the pair of African Pygmy Geese. These exquisite little waterfowl have been here for several years, and must be the longest living pair ever in the U.K. Among birds sharing their accommodation were Turnstones, Egyptian Plovers, the old Scarlet Cock-of-the Rock and a Quetzal. A flock of the most attractive Red-tailed Laughing Thrush *Garrulax milnei* could be seen bathing in the waterfall at the back of this enclosure which also contained Royal Starlings and Streaked Spider-hunters.

In the main waders' aviary Avocets and Black-winged Stilts had again reared young, as both species do annually. Emerald Starlings with young, Pekin Robins and the large (Sumatran) race of the Silver-eared Mesia were also in this aviary, in company with Indian Greenwinged Doves and some very acrobatic Varied Tits. Jacanas trotted across the water lilies as they do in Africa, whilst Avocets flew round calling before alighting to partake of the mealworms dispensed by Mr Sawyer.

By this time the rain had started again as we made our way past more Stella's Lories, Toco Toucans and White-crested Jay Thrushes from Sumatra. Several Kookaburras, including two reared this year, greeted the rain with peals of laughter as we were entertained to tea - in the house rather than on the lawn, as in more clement years.

Philip Schofield

We are again very grateful indeed to Miss Ezra and Mr. Sawyer for giving everyone such an enjoyable and interesting afternoon which was not

spoiled in any way by the weather though this made difficulties in serving tea to nearly a hundred guests, accomplished with wonderful efficiency and cheerfulness by Miss Ezra's helpers. It is also extremely kind of Miss Ezra to donate the proceeds to the Society's funds, and the total raised, including donations, came to £204.

We are indeed fortunate that in Miss Ezra and Mr. Sawyer we have a President and Vice President who are so interested in the life of the Society.

Hon. Secretary

* * *

AVICULTURAL SOCIETY NEWS

First Breeding Awards

At its meeting on 11th July 1987, the Council approved awards for the first breeding in Britain of the following species, no previous record having been traced:

The Avicultural Society's Medal

- Cobalt-winged Parrakeet *Brotogeris cyanoptera*.
Mr. and Mrs. P. Clarke, 1985.
- Peruvian Brown-bellied Amazilia *Amazilia a. amazilia*.
Mr. R. Elgar, 1986.
- Five-coloured Mannikin *Lonchura quincolor*
Mr. R. Green, 1981.
- Chestnut Sparrow *Sorella emini*bey
Mr. A. Brooker, 1985.

The Avicultural Society's Certificate of Merit

- Pallas's Sandgrouse *Syrhaptus paradoxus*.
Chester Zoo, 1985.

Promotion Fund

Whilst the Society extends a very warm welcome to its increasing number of overseas members, especially from North America, the Council is also anxious to recruit more British members. To this end a Promotion Fund has been launched to provide some form of permanent advertisement for the Society, to be displayed in bird gardens and zoos, and various processes are being investigated, e.g. letters engraved on Welsh slate.

Mr. K. Dolton, a Council member, has opened the Fund with a most

generous donation of £200 which is much appreciated. We would be very grateful for more donations and to hear from members whose collections are open to the public and who would be willing to display one of these plaques.

Breeding Loan Agreement

The Foreign Bird Federation, to which the Avicultural Society is affiliated, have prepared a Breeding Loan Agreement, which includes all the essential points that need to be covered when a bird is loaned to another aviculturist for breeding purposes. The form is printed in triplicate - one part to be retained by the owner, one for the guardian and one to be sent to the Foreign Bird Federation whose Council will act as arbitrator in the event of a dispute, provided both parties agree to abide by its decision. Avicultural Society Members may obtain copies of this form by applying to Mr. R. Oxley, 2 Suttons Avenue, Hornchurch, Essex RM12 4LF.

Breeding Register

The Council has decided that, in view of the lack of response from Avicultural Society members to the breeding register questionnaire that has been circularised every year, as well as the lack of demand to buy the results when published, the Society can no longer afford to conduct its own survey. In future, Avicultural Society members are asked to send their results to be collated by the Foreign Bird Federation and a questionnaire is enclosed with this copy of the magazine. Members are strongly urged to help make this survey as complete as possible, thereby presenting a strong picture of the success of aviculture in this country. Strict confidentiality will be observed for those members who signify that they wish to remain anonymous. The Foreign Bird Federation have undertaken to send a resumé of the new Breeding Register, for publication in our magazine.

Summer Lunch

On one of the few fine days of this summer, in fact a heatwave, over 40 members and guests gathered for a buffet lunch at Warren Hill, the headquarters of the Avicultural Society at Hartley Wintney, in Hampshire. This was followed by a most interesting talk by Tony Tilford on 'Photographing Aviary Birds'. Mr. Tilford described all the various equipment available that would be useful for this purpose and showed members how to build or convert cages in which to photograph birds. The talk was illustrated by many of Mr. Tilford's superb slides which amply confirmed his reputation as one of the world's leading bird photographers who is in great demand by publishers to illustrate bird books.

The lovely weather enabled lunch and tea to be served on the terrace of the house and members enjoyed an interesting and pleasant day. In addition, the proceeds from the sale of tickets, amounting to £126, were donated to the Promotion Fund.

The next social meeting is planned for Saturday, 24th October, again at Warren Hill, Hartley Wintney, and further details will be circulated.

Hon. Secretary and Treasurer

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AMERICAN PHEASANT AND WATERFOWL SOCIETY. You are invited to join the Society and receive ten issues of the Society's magazine yearly. Informative and interesting to people rearing waterfowl, pheasants and miscellaneous birds. Deals with incubation, diseases and other factors in rearing birds. Dues. 25.00 US dollars.

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AVICULTURAL MAGAZINE back numbers. Large stock available including some early issues. Sales by post only. Price list available from the Hon. Secretary, Avicultural Society, Warren Hill, Hulford's Lane, Hartley Wintney, Hants. RG27 8AG.

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By Bruce Henry

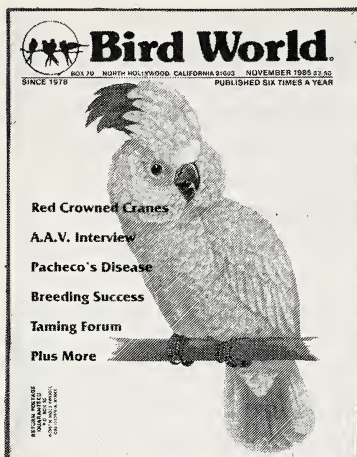
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1987

BREEDING THE GREAT HORNED OWL

Bubo virginianus

By IAN MARSHALL

(Norwich)

The Great Horned Owl is exclusively a New World species. This large owl ranges from northern North America, where it spans the continent between Alaska and Labrador, south to Tierra del Fuego, the Horn of South America.

In common with its close relative, the Eurasian Eagle Owl *Bubo bubo*, the Great Horned Owl occurs as several geographical races. Howard and Moore (1980) list 17 subspecies, occupying such diverse habitats as tropical rain forest, desert, tundra, plains, mountain areas and even parks in large American cities!

Writing in 1893, A.K. Fisher, an American ornithologist, pleaded for this magnificent owl's protection on the grounds that it represented one of the farmer's greatest allies, consuming many rodents and rabbits. Unfortunately, almost a century later L.W. Walker (1974) deplored the fact that many U.S. states deny the Great Horned Owl legal protection and consequently senseless shooting is causing a population decline.

On a happier note, W. and J. Salt (1976), stated that although casualties occur on highways and power poles, legal protection is enjoyed in all the Canadian states and as a result of the bird's tolerance of the proximity of man and his environs, the future of the species seems assured.

My pair of Great Horned Owls are of Canadian stock and I should say that they are of the subspecies known as the Tundra Horned Owl *B.v. wapacutha*. This is one of the larger races with an overall greyish coloration; W. and J. Salt exhibit a good photograph of the subspecies although (such is the diversity of opinion as to exactly which race occurs where) the caption supplied with the illustration gives the owl as *B. v. subarcticus*, the Arctic Great Horned Owl, a race that is considered perfectly valid by some authors but not even mentioned by Howard and Moore.

A Tundra Horned Owl would typically weigh between 3½ and 4 lbs.

Longevity for the species, in captivity, has been given as 29 and 38 years.

The Great Horned Owl is represented in at least 18 British zoos or private aviaries, some of which have pairs from both North and South America. Possibly there are as many as three or four dozen pairs in the country. Owing to the fact that commercial bird dealers do not import owls, some species in British aviculture are known to have descended from but one original pair. In-breeding, with all its attendant ills, is therefore inevitable for these types (although latterly moves by Avicultural Society members have been initiated to help overcome this problem). Great Horned Owls have been imported from at least three different localities in Texas, Ontario and Vancouver, so some essential genetic diversity is available.

History of breeding pair

Both of my Great Horned Owls were obtained in 1986. First to arrive was the female, bred at Paradise Park, Cornwall, in 1985. Mike Reynolds, Curator of Paradise Park, informed me that the parent stock originated from Vancouver Zoo, Canada, and that they had bred for 12 of the last 13 years.

The male owl was also captive-bred, by a breeder in S.E. England in 1982. I managed to trace the bird's history back as far as an Essex based bird dealer but, although the dealer passed on a written request from me to furnish details of the owl's history to the breeder, no further information was forthcoming. I can only hope that the birds are not too closely related.

Although some display occurred during 1986, perhaps not surprisingly owing to the young age of the female, no breeding was attempted.

Accommodation

When constructing aviaries for my owls, I find it convenient to use fencing panels, of the overlapping type, commonly sold by garden suppliers. Using this method it is easy to extend an aviary by simply removing a panel and adding extra space as required.

Accordingly, when I acquired my female owl in January 1986, the aviary measured 12 ft long x 6 ft high x 6 ft wide (3.66 x 1.83 x 1.83 m). Only the front section, measuring 6 ft x 6 ft (1.83 x 1.83 m) was wired using 4 x 2 in (0.10 x 0.05 m) plastic coated 14G welded mesh. The remaining sides and back were solid panels providing shelter and privacy for the bird. The roof was of the same welded mesh covered with PVC corrugated sheeting. When the male arrived in March 1986, I added a 6 x 3 ft (1.83 x 0.91 m) section to one of the sides of the aviary, at the back, to provide a secluded alcove in which to construct a nest-site.

From the panel opposite the alcove extended another aviary, measuring

9 x 6 x 6 ft (2.74 x 1.83 x 1.83 m) in which was housed a pair of Bengal Eagle Owls *B.b. bengalensis*.

Owing to a certain amount of aggression between the male and female Great Horned Owls during 1986 I decided to part with the Bengals, take out the panel partition and thus extend the aviary space available to the Horned Owls to 18 x 12 x 6 ft (5.48 x 3.66 x 1.83 m). The aviary was, therefore, L-shaped and enclosed except for two 6 x 6 ft (1.83 x 1.83 m) areas facing into the garden. A stout oak perch was placed approximately 3-4 ft (0.91 - 1.22 m) off the ground, at each end, and also at the bend of the L-shape.

Two low, upright perches and a large log were also provided.

The male bird, smaller and less heavy than the female, customarily flies from one end to the other rounding the corner on the way. The female rarely does this, preferring to fly only as far as the perch in the corner of the L-shape. The male can thus escape the aggressive overtures of his mate should the occasion demand it. Up to now, this arrangement has worked well and I would not envisage keeping the species in any smaller accommodation.

Diet

My Horned Owls receive a diet of laboratory rats and mice, also day-old cockerels. Food is given in the evening, but if it is likely to freeze, food is offered twice per day. A vitamin and mineral supplement is added to the day-old chicks prior to and during the breeding and rearing season, a pinch of the powder being considered sufficient for a day's supply of food.

Veterinary and hygiene notes

Up to now my Horned Owls have not needed veterinary attention except, in the case of the female, for surgical sexing. As the female bird arrived first, and was thought to be a male by the breeder, I am glad that I had its sex surgically determined, especially as I was able to obtain a mate some weeks later.

Hygienic measures include dusting possible hiding places for mites, such as perches, with a pyrethrum based insecticide, and special attention is given to the nest area. Peat is used as a floor covering in preference to leaf mould which may harbour pests and diseases from wild birds.

Breeding

As wild Horned Owls like to appropriate old birds' nests, I thought I would simulate this by using a wicker cat basket of approximately 24 in (0.60 m) diameter. This was placed 3 ft (0.91 m) off the ground in an enclosed alcove added onto the aviary for the purpose. An upturned turf

was placed in the bottom of the basket and peat added to fill the remaining space. A stout, semi-circular elderberry branch was attached next to the rim to protect the structure when the owl landed on the nest and to provide a secure footing.

The female began to show an interest in the nest-site in January 1987, flying over to it at dusk when the male began hooting. However, it was not until early March that the female joined in the vocalisation so that at dusk the birds would begin to duet; the male having a low four or five syllable hoot, the female a perceptibly higher pitched call of six or seven syllables. Whilst duetting, the birds would face each other and bow low so that the body was held on a horizontal axis, tail pointing skyward, ear tufts raised and the brilliant white throat conspicuous in the dull light.

Ritual beak touching was observed, although the male always seemed nervous of the larger female who would occasionally chase the male around the aviary. No food passing between the male and the female occurred, although the male did place a piece of rat in the empty nest-basket on one or two occasions.

Mating was first observed in mid-March, taking place at dusk when the female, standing on an upright log, solicited the male by hooting and holding her body in the horizontal display posture. Duration of mating on this and subsequent occasions was between five and seven seconds.

Two days after the first mating was observed the female owl began digging a hollow scrape in the peat in the nest-basket, using the beak to bulldoze the material from the centre of the nest to the periphery. Two weeks of displaying, duetting, mating and chasing followed, the male continuing to be very nervous of the female, until the end of March when the female was observed to be sitting in the basket and the male acting in a highly aggressive manner, clicking his beak loudly and flying at the aviary netting when I approached. I should add here that I never enter the aviary to feed the owls; food is 'posted' through a hole cut into one of the panels at the back of the aviary and falls onto a flat stone placed there for the purpose.

On 29th March one egg was seen in the nest when the female came off for around five minutes to drink, duet and mate. A week later, looking through one of several 'spy' holes drilled in strategic places, I saw two eggs in the nest.

After the second egg was laid, no further mating was observed and duetting ceased. The female was only seen to leave the nest for around five minutes at dusk to drink, dust bathe, preen and feed (the male did not take any food to the female on the nest, as may be expected with other types of owl).

Thirty-two days after the first egg was laid, a faint cheeping was heard

in the nest and the female appeared to be unable to settle down. Jerking movements of the body were observed and the nape and back feathers were raised; presumably the movements of the chick underneath the sitting bird were the cause.

At 7.00 p.m., a day after hatching, a hen-like clucking noise signalled the fact that the female owl was feeding the chick. Rats, mice and day-old chicks were available, the female choosing the latter to give to the chick, breaking off small pieces to offer whilst 'clucking' to stimulate the chick to feed. When the young owl had eaten sufficient food the female would continue to offer choice morsels whilst 'clucking' in a louder, more insistent manner, before consuming the remains of the meal herself.

Eleven days after hatching, the chick was seen preening and its second down was coming in. Its eyes were opening and it seemed alert and strong.

A day later, at dusk, the female was observed hooting at and chasing the male around. The next evening, for the first time, the male took food to the sitting female. A surplus of mice and chicks began to accumulate in the nest. Also, the unhatched egg was still present and I decided to remove it in case it got broken and fouled the chick's plumage.

By instinct the chick lay flat and quiet in the nest as I removed the unhatched, infertile egg. The adult owls flew to the far end of the aviary and hooted loudly, but were apprehensive of the long-handled net that I took in with me as a precaution.

At four weeks old the owlet was jumping around actively in the nest. It was now covered with a thick buff-grey down, barred with darker brown. It was observed standing upright holding a day-old chick with the foot, breaking it up and eating much as an adult would. The nest was kept relatively clean by the chick walking backwards to the nest rim to muck (void the faeces) over the edge.

After six weeks the owlet left the nest. Although it had proved capable of feeding itself, it continued to rely on the female to bring it food. On two occasions, however, the male was seen to take food direct to the owlet; previously any food offered by the male had been accepted by the female who would then feed the owlet.

A month after leaving the nest, the owlet was no longer fed by the adults; wing and tail feathers were well grown although downy feathers were still present on head, back and breast. Feet and talons were almost as large as those of the adult male; eye colour was a similar pale yellow. The owlet was now eating day-old chicks and rat. Interestingly, in its 11th week, the male on offering the owlet a day-old chick was rewarded with a sharp peck. Seemingly the young owl regarded itself as self-sufficient as far as food was concerned and resented the attention of its parent.

During the ensuing month the owlet lost its remaining downy plumage

until, by the second week in August, approximately four months after hatching, it could only be distinguished from the adult male by an area of pale down on top of its head and its shorter 'ear' tufts. In order to avoid any future confusion over which bird was which, the young Great Horned Owl was removed from the aviary and placed with a local breeder.

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BREEDING THE JAPANESE WHITE-EYE

Zosterops japonica

By JEFFREY TROLLOPE

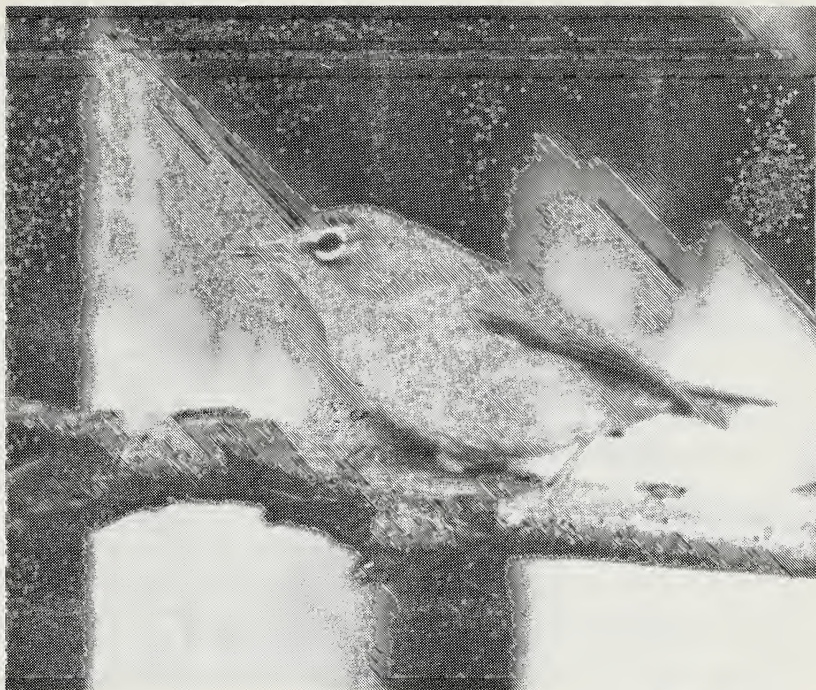
(Hounslow, Middlesex)

The family Zosteropidae consists of a homogenous group of some 85 Old World species. The most frequently imported is the Oriental White-eye *Z. palpebrosa*, closely followed by the African Yellow White-eye *Z. senegalensis*, and the Asiatic Chestnut-flanked *Z. erythroleura*.

Considering their regular availability, successful breeding results have been comparatively few. The sexes are alike throughout the family and it would appear that any possible sexual dimorphism, e.g. the hen duller, is masked by sub-specific or clinal differences. Recently small numbers of the Japanese White-eye *Z. japonica* have been imported and I purchased what I hoped was a possible pair in November 1986.

Description

Approximately 4-4½ in (10-11 cm) long. Bill blackish grey, upperparts greenish olive, head greyish olive, chin and throat light yellow. Underparts,



Martin Trollope

Young Japanese White-eye, 24 days old

breast light grey, shading to white on the lower abdomen. Legs and feet dark grey.

Distribution and habitat

Japan, E. and S. China, Hainan, Taiwan, North Vietnam, Burma, Philippines; introduced into the Hawaiian Islands. Inhabits areas of cultivation, scrub, open woodland and forest.

Food and housing

During the winter of 1986/87 the birds were housed in an outside bird room, maintained at a temperature range of 45-55°F (8-12°C) and an extended day provided by electric light until 20:00 hours. Their basic diet consists of Claus softbill mixtures, both fine grade and coarse, which the White-eyes break up and eat without difficulty. Bio-nectar, cut oranges and apples are provided twice a week, buffalo worms and small mealworms are given ad-lib. In April 1987 the Japanese White-eyes were released into an aviary measuring 3.1 x 1.1 x 2.4 m high (10 x 3½ x 8 ft). They were housed with a pair of Chestnut-throated Seedeaters *Sporophila telasco* and three Chestnut-flanked White-eyes of indeterminate sex.

Breeding

The birds were identified by coloured leg rings, yellow and blue. During April 1987 the bird with the yellow ring was observed singing frequently. On 20th May both birds were carrying upholsterer's fibres and dog's hair into a waxbill-type domed basket, about 1.06 m (3½ ft) high. A neat cup nest was completed by the 21st and the first of three pale blue eggs (pointed at the small end) was laid on the 23rd. Both birds visited the nest frequently prior to incubation, which started when the third egg was laid on the 25th. It was difficult to ascertain the pattern of sharing incubation between the sexes, but it appeared that the male (yellow ring) would sit from about 08:00 to 11:00 hours, and 16:00 to 18:00 hours, though there were frequent brief change-overs, when the female came off the nest to feed. Both birds sat very tight, not leaving the nest even when I looked into the basket. During the change-overs, the bird arriving would carry a fibre or dog's hair into the nest. On 7th June, the birds deserted and the eggs were found to be infertile.

On 16th June the birds started building a second nest. This was completed two days later, a deep cup beautifully constructed of dog's hairs, fibres and a few feathers. The nest was suspended between three thin, vertical twigs in a clump of cut conifer, fixed to the side panel of the aviary, about the same height as the first nest. On the 19th the first of three eggs was laid and incubation started on the 21st, following a similar pattern to the first breeding attempt. On 2nd July two chicks hatched; their skin was light flesh colour, the mouth reddish pink and their gape flanges very pale yellow. Their diet was supplemented by invertebrates collected daily from nettle beds, and fruit flies *Drosophila*.

The parents brooded the chicks in turn, with frequent visits to the nest with food. The chicks left the nest on 13th July; their bills were light flesh colour, yellowish-white at the gape, the upperparts light olive, the underparts greyish white, the feet were light flesh colour. At this stage they lacked the adult's ring of silky-white feathers around each eye. Their tails were short but they could fly quite well on leaving the nest. They were fed by both parents, soliciting food with shivering wings and hunger calls *seep-seep*. By 24th July, the chicks were feeding themselves although soliciting food successfully from their parents. They were now showing white eye rings, their bills were grey at the tips, the chin and throat yellow and the upperparts darker olive, their legs and feet light grey.

The chicks were totally independent of the adults by 2nd August; they had full tails and their plumage was very similar to the adults, although somewhat duller. At the time of writing (14th September) the young have been separated from their parents, who are incubating a third clutch of three eggs.

Behaviour

Before and during the breeding the adult Japanese White-eyes were dominant to the birds housed with them. When they alighted on a feeding platform, other birds would move away or fly off as they approached. When the chicks left the nest, the parents would chase away any bird approaching them. During the day and at dusk, the parents and chicks would often 'clump' together in close contact and allo (mutual) preen. Apart from the foods offered on the feeding platform, both parents and young would glean live food from *Convolvulus* leaves growing on the aviary sides. They would also hawk flying insects and, less often, forage on the ground among plant litter.

ACKNOWLEDGEMENTS

I would like to thank Martin Trollope for taking the photograph

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As described, the Japanese White-eye *Zosterops japonica* has been bred by Mr. Jeffrey Trollope and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or of any other reason that would disqualify this claim, is asked to inform the Hon. Secretary.

BREEDING THE RED-BELLIED MACAW
Ara manilata
AT LORO PARQUE

By ROSEMARY LOW
(Tenerife, Spain)

The Red-bellied is a distinctive small Macaw about 20 in (50 cm) in length. Most macaws have part of the lores feathered but the totally bare lores and yellow facial skin distinguishes *manilata* from all others. This species is mainly green, with blue on head and wings and a maroon patch on the lower abdomen. Undersides of tail and flight feathers are olive yellow. The bill is black and the iris is dark brown.

It occurs throughout most of the Amazon basin, its distribution coinciding with that of *Mauritia* palms on which it feeds. Common in the wild, it is rare in captivity, although quite a few have been exported from Guyana in recent years.

I believe that the most suitable environment for captive birds is an outdoor aviary in a warm climate and a spacious indoor aviary in a cooler climate. A small cage should not be considered.

At Loro Parque the Red-bellied Macaw was represented by a pair in the off-exhibit breeding centre and by two males on exhibit, when I became Curator in February 1987. The pair had been in residence for at least four years without attempting to breed. This is not an easy subject in captivity, being extremely susceptible to stress, also to obesity. Few of the wild-caught birds which aviculturists obtain survive for more than two years, unlike other *Ara* species which adapt very well to captivity.

I know of only two breeding successes prior to 1987, that of Florida veterinarian Greg Harrison and, in the UK, that of the pair belonging to Mrs. P. Vahrman. Her breeding of this species was the result of careful thought and of knowledge of *manilata* in Guyana where she formerly resided. I have the greatest admiration for the way in which she set up a planted house and made her pair search for their food.

The pair at Loro Parque is housed in an aviary of traditional type, measuring about 13 ft long x 3½ ft wide x 7 ft high (4 x 1 x 2.1 m). The nest-box is attached to the outside of the aviary, thus inspection presents no problems. Not that these birds are aggressive like other macaws when breeding; they remained quite shy. The nest-box measures 12 in x 13 in x 30 in high (0.31 x 0.33 x 0.76 m); there is a 5 in (0.10 m) square inspection door near the bottom.

The female laid a clutch of four eggs in April; there were two eggs on



Rosemary Low

Red-bellied Macaw, aged 28 days, at Loro Parque

7th April. On 22nd April one egg was placed in an incubator as a precaution against some catastrophe in the nest. Assuming it was the first egg laid (the third was infertile), the incubation period was 25 days. It hatched in the incubator at 5 p.m. on 30th April, and was transferred at 7 p.m. to the nest of a pair of Illiger's Macaws *Ara maracana* which were known to be excellent parents. They had two chicks, about two and three days old, and immediately accepted the *manilata* chick.

The next day, 1st May, there was a pip mark on another *manilata* egg which was removed to the incubator. The chick hatched on 3rd May and it, too, was transferred to the Illiger's nest. Their eldest chick was taken for hand-rearing, also an egg which hatched later that day. Both these were successfully hand-reared. The third *manilata* egg pipped and hatched in the incubator on 7th May. It weighed 13.2 g.

I made the wrong decision that this one should be hand-reared. It appeared to be progressing well and I was shocked to find it dead at 6.30 a.m. on the fifth day. Autopsy did not reveal the cause of death; its liver was normal but its kidneys appeared abnormal.

The two chicks with the Illiger's Macaws thrived; their crops were

always well filled. They were ringed at 19 and 21 days of age with 10 mm rings. The elder chick left the nest on 17th July, aged 78 days, and the second on 19th July, aged 77 days. They then differed from the adults in the generally slightly duller plumage, very pale yellowish skin on the face (ochre-yellow in adults) and in having the beak only partly black, there being a broad light stripe down the centre of the upper mandible.

Development of the chicks was as follows:

Day 1 - fairly long yellowish down on upperparts and head; down shorter and more whitish on underparts. The beak was whitish and the nails white.

Day 19 - eyes open; ears just open; beak pinkish-white. Head bare, almost wrinkled skin. No feathers erupted but prominent dark lines under the skin, especially on the back (second down). A little short whitish down remained on the back and nape. Tail quills present; wing feathers in quills 1.2 cm to 2.5 cm long.

Day 26 - soft pads on sides of beak dark; beak otherwise white, tinged with grey. Head almost bare. Sparse tufts of grey second down on the back; wing feathers erupting.

Day 40 - wings nearly fully feathered; back and sides of neck bare, crop and underparts virtually bare.

Day 46 - head and wings three-quarters feathered.

Day 49 - head bluish; almost completely feathered. Bare skin on face white. Beak white, grey at base of upper mandible and on the raised pads. Feet and nails grey.

The two young *manilata* and their *maracana* companion were removed to a suspended cage on 10th August. After the first day, when they ate very little in the new surroundings, they consumed corn-on-the-cob with enthusiasm, also the standard mixed food. This consists of soaked or sprouted sunflower, boiled maize, sprouted mung beans and a couple of other types of boiled beans, peanuts in the shell, boiled peanut kernels, apple, carrot and alselgar (similar to spinach but with a larger leaf). Other fruits in season, such as cactus, pear and palm fruits, are offered. The chicks were reared on this food, plus bread and milk.

After the removal of their eggs at the beginning of May, the female Red-bellied Macaw produced a second clutch of three eggs, one of which (probably the last) was infertile. The first egg was laid on 1st June and there were two chicks by 27th June, again giving an incubation period of 25 days.

The chicks were very well cared for by the parents. Unlike those reared by the Illiger's, when disturbed for nest inspection or to change the wood shavings, they would roll on to their backs with their feet in the air in the typical macaw defensive position. They were ringed when

26 days old with 11 mm rings. The young were always a joy to hold - so plump and sweet-smelling. They left the nest for the first time on 8th September but for the next few days spent much of the time inside the nest.

Parent-reared macaws are, in my limited experience, much heavier than those reared by hand and I was pleased that with this important species four chicks were reared by this method in 1987. In many groups of parrots hand-reared young are equal or superior to those reared by their parents but this has not been my experience with macaws at Loro Parque this year.

The young will be retained for breeding purposes. Fewer problems should be experienced with captive-bred birds, which may be the main hope of establishing the Red-bellied Macaw in aviculture.

Finally, I would like to acknowledge the excellent keepers who were involved with the rearing of this species at Loro Parque.

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BREEDING TWO SPECIES OF BROTOGERIS PARRAKEETS AT LORO PARQUE

By ROSEMARY LOW
(Tenerife, Spain)

The small neotropical parrakeets of the genus *Brotogeris* are not well represented in collections. At Loro Parque six of the seven species are kept. The two pairs of *tirica* are off exhibit at the time of writing (one pair is to be placed on exhibit) and the Orange-chinned Parrakeet *B. jugularis* is not present in the collection.

Members of the genus are notorious for failing to breed in captivity. However, Robbie Harris, a private aviculturist in California, has bred six species (she does not have *tirica*) and is perhaps the only person to have achieved real success.

Her cages are small, as are those at Loro Parque. The latter measure approximately 58 in (1.5 m) long, 32 in (0.82 m) wide and 40 in (1.02 m) high., and are suspended about 3 ft (0.91 m) off the ground. No *Brotogeris* had been reared here until this year, I believe. I am thus pleased to report success with two species.

The Cobalt-winged Parrakeet *Brotogeris cyanoptera* has very seldom been bred in captivity. It originates from the western part of the Amazon basin. There is one pair of the nominate race on exhibit and three specimens, also of the nominate race, off exhibit. The latter are so much more brightly coloured that I believed that those on exhibit must have been either *gustavi* or *beniensis* until the German aviculturist Thomas Arndt assured me that they were not. None answers precisely to the descriptions given by Forshaw (*Parrots of the World*, 1971) for example. In August 1987 Carlos Keller, an extremely knowledgeable Brazilian aviculturist, visited Loro Parque and told me that the more brightly coloured birds originate from Acre, in Brazil. They are much brighter yellow on the forehead, the yellow being more extensive in the believed males which have the crown tinged with blue.

It is regrettable that because of the difficulty of inspecting the nests in the range of cages for the *Brotogeris* parrakeets, I can provide no information on the development of the chick of the pair on exhibit. The nest-box for this pair is very small, measuring about 4 in x 5 in x 10 in high (0.10 x 0.12 x 0.25 m), of a sloping design. The first of three eggs was laid about 20th April and hatched on about 14th May. The young bird left the nest on 2nd July, i.e. after about 49 days. It was very confident and a joy to watch with its very attentive parents.

On fledging it differed from them in its much smaller beak, also in the beak coloration, the upper mandible being dark brown, except the fleshy pads at each side. The feet were grey, not pink tinged with grey as in the adults. The orange spot on the chin was as bright and as extensive as in the adults. The lores, also a very small area of the forehead, were tinged with yellow. There was a faint blue tinge on the head and a little yellow on the carpal edge of the wing. The cere was white.

Incidentally, the male parent has a larger head and beak but plumage does not differ in male and female.

The bond between the three birds is very close; they are never more than a few inches apart, usually with the young one in the middle. It will frequently take hold playfully of the upper mandible of one of its parents but apparently not in a serious attempt to solicit food. Mutual preening between parents and young, including vent-preening, is frequently observed.

According to Forshaw, the call of this species is undescribed. It emits a Budgerigar-like chirruping, also squawking similar to that species, but not as loud.

The three other *cyanoptera* at Loro Parque were caged two and one without a nest-box until late May when a cage in the second breeding centre (just constructed) was available for them. The three birds were then housed together, sexes unknown. Believed to be two males and one female, they were immediately compatible. During the third week in July the female started to lay. There were four eggs by 31st July but these proved to be infertile.

In the next cage to the *cyanoptera* on exhibit are a pair of Orange-flanked or Grey-cheeked Parrakeets *B. pyrrhopterus* which had laid clutches of six in 1985 and five in 1986. Two eggs of each clutch were fertile and chicks hatched but these apparently died after being removed for hand-rearing in 1985 and when left with the parents in 1986.

In 1987 the female had laid four eggs by 7th April. Two chicks hatched, the first on 22nd April. They were removed for hand-rearing on 1st May when they weighed 29.2 and 31.8g. On that day they were ringed with 6 mm rings (the *cyanoptera* was ringed when about 14 days old but the ring came off). Weights were as follows: 5th May, 33.7g and 34.3g; 12th May, 36.4g and 37.4g; 19th May, 43.2g and 45.4g; 26th May, 55.1g and 57.2g; 2nd June 61.2g and 65.8g; 9th June, 59.5 g and 68.0g. The 16th June was the first day on which they commenced to lose weight; they then weighed 53.8g and 64.8g and were still feeding well from the spoon. Favourite foods when they started to eat were spray millet and corn-on-the cob.

On 22nd June they weighed 53.8 g and 60.8g. The next day they were removed from the hand-rearing room and four days later to a suspended

cage outdoors. They ate corn cobs ravenously and these were offered for the next month. By then they were eating the standard food well. This consists of parakeet mixture (canary, millet, groats and sunflower plus chopped apple, carrot, alselgar (similar to spinach but with a larger leaf) and peas.

They were enchanting little creatures at weaning stage, similar to the parents except for the bill which is dark brown with the soft pad white. This bill colour gives them a more gentle appearance than the adults. The only other difference is in the darker colour of the feet of the immature birds - grey rather than pink.

The hand-rearing food consisted of the following blended with mineral water: wheat germ cereal, baby cereal such as Nestles Seven Cereals, Three Fruits or Multifrutas, oatmeal, a little carrot, apple and alfalfa, a small amount of soaked mung beans, soya flour and a few drops of Dayaminerals (Abbott Laboratories SA, Madrid), occasionally peanut butter and a little calcium.

As already noted, the chicks from the first clutch were removed for hand-rearing on 1st May. A second clutch, consisting of five eggs, was laid at the beginning of June. By 3rd July four chicks had hatched; the fifth hatched two days later.

The two older chicks were removed for hand-rearing on 10th July. The nest-box was of the same dimensions as that described for the Cobalt-winged Parrakeets; it was simply too small to hold five chicks. On that day they were ringed with 6 mm rings. The third and fourth chicks were ringed on 14th July and the fifth two days later.

The parents made an excellent job of rearing the three young. The first two left the nest on 12th August but for two or three days spent most of the time back in the nest. The third chick left on 15th August. The behaviour of the family was identical to that of the *cyanoptera*; from very soon after fledging the young would preen their parents as enthusiastically as their parents preened them. They quickly learned to feed on their own.

Meanwhile, one of the two chicks from the second nest which was being hand-reared developed unusual markings. Each feather of the flanks and the sides of the upper breast had a bar of orange near the tip of the feather, producing a very attractive barred effect.

These two chicks weighed 31.9 g and 33.9 g when removed from the nest on 10th July. Subsequent weights were as follows (in grams): 16th July, 39.7 and 37.1; 23rd July, 41.2 and 37.1; 30th July, 52.0 and 49.7; 6th August, 64.8 and 62.1. The 10th August was the first day on which they lost weight: 64.8 g and 65.1 g. On 13th August they weighed 64.6 g and 61.6 g and on 20th August, 64.9 g and 61.6 g. They were removed from the hand-rearing room, weaned and on 26th August weighed 58.3 g

and 58.7 g. Again, the favourite food was corn-on-the-cob and spray millet.

I am especially pleased that the pair at Loro Parque produced seven young in 1987. The Orange-flanked Parrakeet has a limited range in north-western Peru and south-western Ecuador. Certainly in Ecuador its numbers have declined considerably in recent years due to the combined pressures of habitat destruction and excessive trapping.

In the 1970s this species was exported in quite large numbers. Tame young birds could be obtained for extremely low prices. Then Ecuador and Peru prohibited the commercial export of their fauna and this species became virtually unobtainable. Breeding successes were almost non-existent. In 1979 or thereabouts Peru again allowed the export of birds and enormous numbers of *pyrrhopterus* were imported into the USA. Between October 1979 and June 1980, for example, over 7,500 were imported into the States; very much smaller numbers reached Europe.

This delightful little parrakeet is now fairly rare and seldom bred in Europe. As a threatened species, it deserves more attention from aviculturists. It is in danger of dying out in captivity and of becoming rare in the wild.

My aim is to have several breeding pairs at Loro Parque. I would like to hear from other breeders who would be willing to exchange young to form unrelated pairs. And may I urge anyone who has a single bird to make an effort to ensure that it has the opportunity to breed. Success will bring so much more pleasure than a single pet bird.

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WHITE COCKATOO HUSBANDRY

By TONY SILVA

(North Riverside, Illinois, USA)

Have you ever wondered what the name of a species signifies? For me, etymology or the definition of words is a curiosity; I often page through ancient journals just to learn the meaning of a word. Often there is an interesting history. A case in point is *Cacatua*, the name given to the white cockatoos.

Cacatua is derived from the French *kakatoès*, said to have been derived from the Malay *kakatúa* - an onomatopoeic word.

This group of birds has the plumage invariably white or pinkish, greyish if one wishes to include the Galah or Rose-breasted *Eolophus roseicapilla* in the genus *Cacatua*. All have crests, this being greatly developed in the Moluccan or, as I feel they should be called, Salmon-crested *C. moluccensis*, and virtually absent in the Goffin's *C. goffini*. Almost invariably, the crest is raised when startled, when threatening or during the breeding display; at other times it is held against the crown.

Cockatoos also 'hiss' and often stomp one foot against the perch; both of these displays are used to scare intruders or to threaten.

The breeding display usually consists of opening the wings, screeching, fanning the tail, and making various movements; in the case of the Sulphur-crested *C. galerita*, the head is moved in an imaginary figure eight. In the wild, as I have seen at first hand, males sometimes chase their mates wildly through the trees. All the while, aerial acrobatics are used.

In their native habitat, the females can flee from overly aggressive males, whose driving can turn vicious. In captivity, however, the birds are imprisoned together; an exceedingly cantankerous male in a fit of anger - these personality changes, from a lovable to a blood-thirsty bird, can occur on a pinhead and usually without warning - can often succeed in maiming or killing his mate.

I have known of long-term proven pairs that were very devoted to each other. Suddenly and without any warning, the male viciously turned on his mate. In one case, her neck was broken; in another, the breeder found the male chewing on the leg of his mate. Her body, mutilated beyond recognition, was in the nest.

It appears that Moluccan, Australian Sulphur-crested *C. galerita*, Major Mitchell's or, as most Americans call them, Leadbeater's *C. leadbeateri* and the *sulphurea* group are the worst offenders.

Before an attack, there is usually a change in the aviary or nearby. In

one case in my collection a female, with which the male had been paired previously, escaped; they had been separated because he is a very large bird and she is a small, deeply coloured individual. Immediately, the male recognised the smaller hen, to which he had always been attracted, and started to display. Without warning, he attacked the hen with which he had been housed. Had I not been in the room at the time, she surely would have been killed.

There are ways of reducing the risk of a male injuring his mate. During the breeding season, his wings should be clipped; I prefer clipping the flight feathers on one wing, thereby permanently grounding him. Also, with the aggressive species, I suggest housing them in extensive aviaries, so as to reduce the chances of the male having easy access to his mate.

A New Zealander told me several years ago that unless he kept his *galerita* in 20 ft (6.10 m) long aviaries, the males invariably killed their mates. Not all of us can afford to have such extensive enclosures, but I would suggest that at *minimum* a 12 ft (3.65 m) long enclosure should be used.

At Havana Zoo, Cuba, this same species has proved problematic - the males have killed their mates in the nest. To circumvent this, all nests have more than one opening, permitting the hen to flee should a mad-dened male enter.

I point all of this out not to scare a potential cockatoo breeder, but so that one can be ever watchful. Moreover, so that the appropriate steps be taken to circumvent any losses. Indeed, never has the loss of a hen prevented me from trying to breed this fascinating group, which reigns supreme in my collection. What I do is to urge birds to pair naturally - this was the dictum after the aforementioned incident with the Molucans - and to watch for any ruffled feathers, aggressive acts and hens that stay on the floor of their enclosures, where they have been banished by their splenetic mates.

My cockatoos are housed in enclosures according to size. The larger species have longer flights, the smaller are given less space. However, after several years of experimentation, I am convinced that extensive enclosures are neither imperative to fertility nor breeding. As an illustration, a pair of Bare-eyed or Short-billed Corellas *Cacatua sanguinea* in my possession produced young while only two years old in an enclosure 30 in (0.76 m) long.

Over the years, we have learned quite a bit about nest preferences. Initially we used very large metal rubbish bins, but these were not entered readily; the birds often perched at the entrance, opened their wings and screamed. After examining several nests in the Australian outback, I realised that they were just too large - smaller nests were in order.

We now use small metal drums for the larger species, and stainless steel nests 24 in (0.61 m) deep and 12 in (0.30 m) square for medium-sized species (e.g. Citron-crests). All of these have an inspection door. Despite the shininess, the birds seem to take to them very readily.

After examining nests in Australia and other parts of the world, I have realised that large nests are rarely used; sometimes the parrots will select an inferior site next door, just because its dimensions are smaller. Security is inherent in smaller orifices.

We do not add the usual shavings to the nest, but force our pairs to work and create their own. Each nest has several pieces of rotted wood inside. As the hens chew, the males become interested and assist, thereby strengthening the pair bond. Moreover, the darkness of the cavity stimulates the gonadal development.

Perches are invariably made from wood - not pvc pipes, which are difficult to grip or, if roughened, can wear the foot pads. I have stated many times before that if a breeder cannot take the time to replace the perches on a regular basis and is intent on using pvc or metal, he/she should not keep birds at all, for this shows a lucid lack of consideration.

The diet used in my collection is being used widely across the US, after we showed its effectiveness. In the morning the birds receive sprouted seeds, fruits and vegetables, and occasionally wheat bread, dog or cat chow and corn-on-the-cob. The seeds constitute 50% or less of this feeding.

Variety is the key. We use sunflower and safflower one week; corn, safflower and parakeet seeds (minus hulled oats, which ferment very quickly) the next; and soya beans, corn and sunflower the ensuing. The idea is to vary the diet. Similarly, we alternate the vegetables and fruits from week to week. The morning that this article is being written, they are receiving broccoli, apple, cantaloupe, carrot and eggplant. Next week, we will replace some of these with cauliflower, cabbage, beets, oranges and others.

After spending considerable time in the field studying wild parrots, I have become convinced of the importance of variability. Wild parrots often forage on one food, then drop it for another. They rarely take dry seeds when seeds in the milky stage are available, hence the reason for using germinating grains.

Occasionally, during the coldest days of winter, we add some dry seeds to the mix. This is done for the oil content, which will help generate more heat.

The birds are not given a bowl full daily, but enough so that most of the food has been consumed by noon. At dinner time, they are again fed - cooked foods, meat, fish, poultry, pasta, etc. The stipulation is that nothing excessively greasy or spicy is used - anything else can be and is given.

The feeding of restricted amounts and offering food twice daily is done to replicate the wild, where parrots forage in the morning and again after the hottest midday hours. Wild parrots never become excessively overweight, so it is for this reason that we restrict food availability. Overall, my experience has been that parrots slightly on the thin side produce fertile eggs and are much more willing to nest than those that are overly plump.

Nesting pairs or pairs with young receive more food.

We do little in regard to lighting or temperature to stimulate nesting. This seems to come naturally. Traditionally, most pairs start nesting in April, though isolated couples nest all the year round.

All cockatoos' eggs are white. They hatch around 28 days, though this can vary slightly. Chicks are born covered in yellow down, varying in amount from a thin wispy covering in Goffin's to a thick, brighter yellow in Citron-crested. Their ears are open from birth and the soft bulbous swellings so prominent in macaws, for example, are absent; instead, these birds have a gap, which the parents grab during the pumping action.

The following notes illustrate the growth of one young Goffin's Cockatoo.

1.9.1986: Newly hatched; weight 12.8 g; yellow down, lighter than in the Citron and slightly sparser than in *sanguinea*.

13.9.1986: 66.3 g; eyes open; head larger than in *sanguinea*.

17.9.1986: 131.0 g; all pin feathers emerging; feet grey; small crop - the smallest of all cockatoos reared to date; very quiet.

25.9.1986: 205.9 g; porcupine-like in appearance; decidedly Goffin-like in appearance.

7.10.1986: 250.8 g; tail 38 mm long; fully feathered.

21.10.1986: 265.0 g; tail 38 mm long; fully feathered.

29.10.1986: 242.5 g; tail 50 mm long; weaning.

16.11.1986: Weaned.

Chicks resemble adults on weaning, with slight variation. In Sulphur-crested a few greyish feathers are often present on forehead; in Goffin's the crest is slightly longer; in Bare-eyeds the periophthalmic ring, covering a large area and deep purple in adults, is lighter and smaller, hence giving some semblance to Goffin's; and in the Lesser Sulphur-crested the mandibles are white. Interestingly, in the Citron-crested (treated by most authors as a subspecies of the Lesser), the mandibles darken from a young age. This and other characters lead me to believe that it should be treated as a separate species.

During weaning, the Bare-eyeds become very thin, until they finally start feeding themselves. Citron-crested prove problematic partway through development, when they become difficult to feed; once fully feathered, however, they are no longer a major problem.

Over the years we have managed to breed Goffin's, Triton, Medium Sulphur-crested, Umbrella, Moluccan, Citron-crested, Bare-eyed and Lessers. We are currently concentrating our efforts on Australian Sulphur-crested and Red-vented.

During this time we have managed to rear some considerable numbers. For example, in one year alone we hatched 11 Bare-eyed. Of these, nine reached independence; the two that died did so from a change in the diet - a change that brought the level of protein in the formula up slightly. This was not tolerated by the young. Every year, the aforementioned species nest; more than one pair of each usually produces young.

In the course of our work we have noted some interesting points. In many cockatoos hens about to lay produce very dark droppings; they also seem to stop eating the day prior to egg-laying. Major problems have been averted with Moluccans by removing the males after each clutch. He is then moved into a separate cage, and a rotating male given to the hen. We find that by moving them we increase fertility - a problem that plagues every breeder of this impressive species - and reduce the chances of attack, as he never really has a chance to become very 'chummy' with the hen. Also, because he is introduced into her territory, the female remains dominant for a while.

Again with the Moluccan, we offer to some of our pairs nests that are almost horizontal. This prevents pairs that often become very nervous when eggs or young are present from literally flying into the nest on sight of their keeper. As the box hangs at a slight angle, the eggs are always laid at the lowest end, the end opposite the entrance.

We have concentrated our efforts here on a few genera, among them cockatoos. Many will wonder why. The reason for this is that greater knowledge will be gained from a group as opposed to a Noah's ark type collection; secondly, we can provide a number of young yearly to the pet trade, thereby reducing pressures on wild populations and we offer many individuals the chances of owning a hand-reared young; thirdly, the reliability of the cockatoos nesting each year generates the income needed to maintain the more difficult species and allows us to continue with the research we are carrying out on parrots in the wild. Besides, they are one of my favourite groups.

If you are looking for a group of birds that meets any of the above criteria, may I suggest cockatoos. They will not disappoint you!

NEO-TROPICAL FINCHES

Reminiscences of a Wandering Aviculturist

By ROBIN L. RESTALL
(London)

In 1974 my company transferred me from Spain where I'd been living for the previous four years to Venezuela. My peripatetic life had begun much earlier when I went to live in Switzerland in 1947. A little later, five years in the RAF took me to Germany and Cyprus, and a career with an American advertising agency which began in London, went on to Denmark and Norway, then to Spain. I was very much the European.

I had been keeping birds for around 25 years by then, from the humble beginnings of a pair of Tri-coloured Nuns, as they used to be called, to the Spanish Sparrow. In between were included toucans, conures, buzzards and hoopoes and much else weird and wonderful. For some reason I've never quite understood, however, finches were always dominant. I think maybe it was a recognition that it is better to be a master in something modest, than be half-useful in everything. Also, there were so many real experts studying and filming big, attractive, interesting birds, like flamingos, woodpeckers, geese, pheasants, owls, parrots. I saw great value in picking up the crumbs from the avicultural table. During my tenure in Spain I even wrote a book on finches - sadly long out of print now, otherwise I'd go out of my way to plug it.

So here was an entrenched European, a lesser authority on finches, going off to a continent so rich in birds that it still contained many species not even discovered. I found Venezuela to be even more exciting for a bird man than I'd imagined. With well over 1,300 species it ranked only second to Colombia as the country with the greatest variety of birds in the world. On my first weekend's outing with the local Audubon Society I saw 122 species, most of which I'd never seen before and many of which I'd been unable to identify, but had noted only by quickly making sketches and diagnostic notes to be analysed and discussed later.

Venezuela sits within 10 degrees north of the equator, and has probably the richest variety of geography of any country, from Caribbean coast and mountain rain forest, to Amazon jungle, from Andean heights to flat, central plains, from a true arid desert peninsula to cloud forest where you can actually see plants grow before your eyes. In this paradise I soon discovered finches I hadn't realised even existed before. Month after month, excursion after excursion, I caught, photographed, recorded, banded and released finches which were then, and to this day are still unknown to most avicul-



BLACK-STRIPED SPARROW
Arremonops conirostris



PECTORAL SPARROW
Arremon taciturnus

turists around the world. The list includes birds like the Black-striped Sparrow *Arremonops conirostris*, and the Pectoral Sparrow *Arremon taciturnus*, two very handsome big birds I found very easy to keep on a diet of mixed seeds under very normal conditions. The Stripe-tailed Yellow-finch *Sicalis citrina*, a delicate little bird, supposedly related to the robust and aggressive Saffron Finch. It needed care and attention before settling down in confinement.

In the introduction to my book on finches I wrote: ‘...with some rarely imported species, it has not been possible to write anything because the information simply isn’t there. This was particularly the case with some South American species’.

It is still the case for despite this experience I have written very little since, and to my knowledge nobody else has either. On the continent of Europe, those masters of aviculture, the Germans have been breeding the rarest and scarcest of finches from South-East Asia, and other readers can no doubt give evidence of this. Fifteen years ago the parrot finches *Erythrura coloris* and *E. kleinschmidti* were virtually unknown. Today they are being bred in Germany, and Mike Fidler is hoping to establish a breeding strain of *E. coloris* in England. Fifteen years ago nobody in Europe was keeping any South American brush finches, and they’re still not.

Why should there be any mystery about South American finches? There are two factors at least, maybe more. First is an unfortunate tradition among bird trappers. In Mexico, for example, all hens that get caught go into the pot and are eaten. They don’t get released, I know because I’ve been there and seen for myself, and I’ve eaten *pajaros con arroz*. I can imagine how a classy restaurateur would describe it in his menu. ‘Only plump-breasted hen birds are gently sauteed in the finest rice, delicately

seasoned with salt and hot pepper juice'. When the Spaniards colonised Central and South America they took with them the great Spanish tradition of eating small birds. I well remember an English family who innocently set up a bird feeding table in the garden. In no time the word got around (or should I say, chirrup) and there were visiting finches all day long. What mystified them, however, was that, when each time they returned from holiday or a long weekend in the capital, there would be no birds coming to be fed. It would be a week or more before there would be the beginnings of significant numbers of birds returning. It never occurred to them to ask their Spanish cook and her gardener/driver husband if they could throw any light on this mystery. They assumed that the cook had continued to put out bread, scraps and seed!

It was over a year before they discovered that the day after they went away - every single time - the cook would trap the birds, stew them in rice and eat them. *Pajaros fritos* is another favourite. In this delicious recipe live finches are dropped into boiling oil. The feathers go all crispy and crunchy. But before you pass out in horror, reflect for a moment on the way we cook lobsters and other shellfish



I remember attempting to persuade an old trapper in Mexico of the desirability of keeping the hen birds. I told him the crazy gringos and ingleses, not to mention those stupid alemanes, could be persuaded to pay even more for hens than cocks. He simply couldn't believe me. Once I explained that we wanted them to breed from, he quickly saw that if we began breeding cardinals and finches back in our own countries, we would soon be less likely to buy from him and he'd lose his livelihood. The Eastern Blue Grosbeak is quite typical of the species where we only ever see male birds. Of course some females do get through, but nowhere near enough and with some species they are very rare indeed. Going further south, to Peru, from where most South American shipments come these days, the story is much the same. The birds the Indians bring in to market and supply to the dealers are those that are easy to catch and have a certain sale. Where

the sexes are similar, or females resemble young males, they are included. When they are caught for the pot, all birds are equal. Sadly, however, males usually outnumber the females naturally. And females are not as hardy. In some species, like the *Carduelis* siskins the rigours of trapping, retaining and shipping wipes out 75.0% of the females anyway. The Black-hooded Siskin *Carduelis magellanicus*, common over much of the continent, is a typical species in this respect.

Twice last year I collaborated very closely with two importers in England. One was arranging a shipment from Mexico, the other wanted birds from Peru, and from Chile. I wrote many telexes in Spanish, and made many telephone calls. I was concerned to see that the dealers at the other end really got the message about shipping males *and* females and would send some less traditional species. My personal motivation was the hope that they would include some *Catamenia* finches, and brush finches. Always the answer is yes. Si, señor. Entiendo bien. No problem. The results? As always.

Not long after arriving in Venezuela I became a director of the Audubon Society there, and acted as a guide and instructor on the monthly outings organised for interested people. Taking from 20-50 people on a field trip to spot birds is not easy as I'm sure many of you will attest, and small passerines rarely stay around long enough to be studied by two to five people, let alone 20 to 50. Thank God for buzzards and eagles, herons and duck. Within a year I graduated to managing a major year-round survey of a single location. Two dedicated friends and I formed the nucleus of a survey of the wildlife of a large ranch which extended from a large reservoir in the west, over several kilometres to thick scrub in the east, from arid hills in the north, the beginning of the foothills of the northern cordillera which ran west to begin in the Andes, through dense gallery jungle to the beginning of the Llanos, the plains in the South.

We took a long weekend every month, for 13 months. During this period we took high and low temperatures, counted and recorded the birds, mammals, fishes, and either drew or photographed them all. In addition we recorded and photographed all the flowering trees and shrubs.

There was a large triangle of flat land at the edge of the big reservoir, favoured by finches at certain times of the year. Depending on the time of year the reservoir either rose to a level where it flooded the area, or the water receded to the point when the grass began to dry and die off. Most of the year, however, the grass grew long and lush, and the ground was soft and damp underfoot. On one occasion I'd set four 30 ft (9.14 m) mist nets one after the other along the edge of the field. There were flocks of small seedeaters, mostly *Sporophila*. I wanted to analyse them by age and sex and be sure of the identities, and had decided to string our party out across the area at the opposite side, and walk towards the net, driving the birds

before us.

Many of the birds flew over the nets up the surrounding hillside, but about 150 or so flew into the net. Some folk, the children and those not expert with mist netting retired to the jeeps and land rovers. Three of us worked like high speed, very excited robots, ticking birds off on lists already prepared and tucked in our belts. Everytime a surprise was found there would be a shout and we would decide whether to bag the bird for photography later or do it there and then. We found two species of grass-finch suspected of being there but hitherto not yet spotted.

One unexpected catch was a Ferruginous Pgymy Owl that surprised and delighted us, and we had fun speculating on its behaviour to be found in open grass around 11.30 in the morning. In the forest we were always able to attract small passerines by playing a recording of this bird's call. They would turn up fully agitated to mob the poor creature. On this particular occasion we returned to the base camp to rest up during the heat of the mid-day, and take a little light refreshment. The owner of the ranch turned up there and, not knowing where we'd spent the morning, told us not to go over to the reservoir. It seems that he and a couple of men from the neighbouring ranch had been over there the day before and killed a couple of dozen rattlesnakes. The damp had been ideal for frogs, and rattlers love frogs. I nearly swooned when I thought how I'd encouraged the women and children to walk through that grass!

During my time in Venezuela I lived in the capital city of Caracas. Despite being incredibly over-built, with virtually no space for parks or plants, there are many gardens, trees in the streets, and hundreds of little corners that are wooded or covered with thick impenetrable shrub. For a couple of years I set a trap cage or two in my garden between 6 and 7 o'clock every morning. I did not use a decoy unless I'd caught one of a pair and was trying for the mate. All the birds were banded with single coloured plastic rings and carefully recorded. It became fascinating to me how some birds would come back time and again and go straight into the trap, others might be equally regular visitors but once caught never again.

Among the finches it was easy to catch the Blue-black Grassquit *Geospiza (Volatinia) jacarini* and the resident birds would be caught about once a week. The territory-owning Black-faced Grassquit *Tiaris bicolor* could be caught every day, and if I baited one of the traps with mealworms the same bird could be caught twice or three times in an hour. In contrast the Saffron Finch *Sicalis flaveola* could never be caught twice, furthermore even using one of a bonded pair as a decoy it was very difficult indeed to catch the other bird.

I have the habit of using these same drop cages in my aviaries now. I find it a much more satisfactory way to catch a bird up than trampling over

plants with a net and terrifying many of the birds. If you're wondering how the bird I want knows how to go into the trap, but the others not - well, it's a matter of knowing your birds. In my case, an empty trap with no bait will always get the parrot finches which must be among the most curious of birds. Mealworms will get the buntings and grassquits, fruit will get the Grosbeak Starlings. The munias will not be caught by food alone, and need a decoy. Single birds of a species will usually be attracted by another of their own species.

Saffron Finches cannot be caught twice. My birds have fallen for each of my tricks - but only once. I find these birds on a par with the House Sparrow for intelligence, and I'm sure it is no coincidence that where the Saffron Finch is endemic, the House Sparrow has failed to establish itself.

I have written recently about the Venezuelan Saffron Finch in the *Avicultural Magazine* (Vol. 92, No. 2: 83), so will not go into much detail now. Unlike the races that occur elsewhere, this race is clearly distinct between the sexes, at all ages. The birds in juvenile plumage are distinguished by the width of the yellow band around the nape and breast. Birds of the same age pair up while in this plumage - indeed will often breed. They are inseparable and where there is one, the other is close by. In adult definitive plumage the male has a distinctly more orange crown, while the female is more striped and olivaceous on the mantle. A pair side by side in the field are very clear.

There are many other species in the same genus as the Saffron Finch. Frankly, I'm not sure whether the Saffron Finch is truly related to them. It has many behaviour characteristics that remind me of the cowbirds and grackles, or alternately the true sparrows. Sibley's protein analysis says it is a tanager. Anyhow, the other birds in the genus *Sicalis* are much more like typical grassland finches.

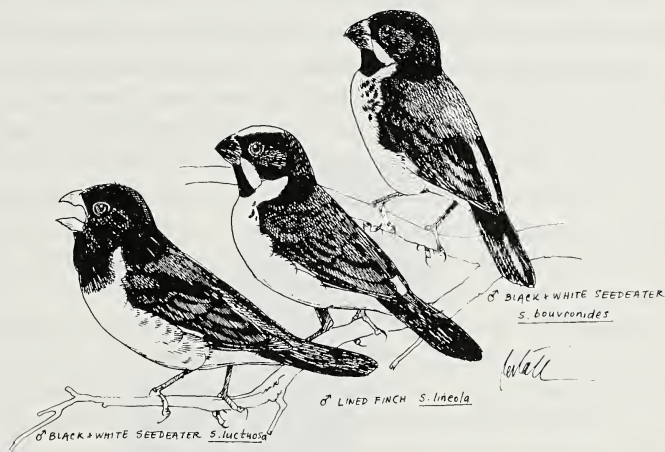
The Grassland Yellow Finch *Sicalis luteola* comes from Venezuela and most other parts of Latin America. I kept it on two occasions there and found it to be a dull and totally uninteresting species. Since returning to England at the end of 1984 I have kept it on two more occasions, birds from Guyana, and others from Peru. Each time I found it to be an amazingly dull bird. In contrast, the Mexican race *S.l. chrysops* - which on comparative behaviour is a very different bird indeed - is a noisy, aggressive bird that deserves to be cultivated.

We recently received some Puna Yellow Finches *S. lutea*, a species from northern Chile. It too proved to be noisy, aggressive between its own kind, but a cheerful and persistent songbird.

In a planted aviary with just a few mealworms a day, this genus of finch will breed and rear healthy young. My birds have not gone frantic, combing every bush and leaf for small insects when their eggs hatch in the way

that some finches will. So it's a simple recipe for success - a planted flight to themselves, reasonable peace and quiet, and the kind of live food easily managed at home with no need to scour the fields every morning at dawn.

One of my lifetime passions is the genus *Sporophila*, the 32 or so small seedeaters of South America. Most of them come from Brazil and are little known or understood but there are several species that occur commonly in aviculture. The Danes in particular seem to have bred them regularly, and I'm sure the Germans also have done a lot with them. In my experience they will breed in aviaries but are reluctant to go down in cages.



There is a species, two distinct races or sibling species I'm not sure and I don't think anybody else is. A very expert ornithologist, the late Paul Schwarz studied both the Black and White Seedeater *Sporophila bouvronides* and the Lined Seedeater *S. lineola* in Venezuela. He died before his conclusions could be published and his notes and tapes were impounded by the Venezuelan government as national property. Now, some five years later, we're being allowed access to the tapes and I hope one day we'll find all his notes on this species. It seems that *lineola* breeds in the south while *bouvronides* is moulting and wandering around in loose flocks in the north, sometimes reaching *lineola* breeding areas. Then, when *bouvronides* breeds in the north, the *lineola* population drifts northwards in flocks of mixed adults and juveniles.

A larger black and white Seedeater, *S. luctuosa*, ranges from western Venezuela, where I saw it but never caught it, down to Peru from whence it is exported. I had three pairs last year. I tried, but failed to breed it in cages. The male is the bird which selects the nest site and begins making a nest, a well-developed start to the nest plus a lot of energetic singing and

chasing is needed to stimulate the female to ovulation. I have found the hens are very adept at ignoring the singing and resisting the chasing in cages, whereas in an aviary the whole behaviour pattern becomes much more natural.

Text books will say keep only one pair to an aviary else the males will fight until one or other is killed. I have an L-shaped planted aviary, some 30 ft (9.14 m) long, with a shelter attached, and I find that a formula of two pairs of each species produces very good results. The males set up their own territories and sing vigorously, chasing each other furiously when each infringes on the other's air space, while the females have the run of the establishment. Of my three pairs, one of the 'females' moulted out into male plumage in its third year. It had shown no sign of being a male - by which I mean it had no white on the primary wing feathers.

I bought a single, immature Chestnut Seedeater *Sporophila melanocephala* while living in Caracas. I painted it every couple of months as its plumage changed, until it became a full adult male. At this point I found a hen. They were the only two individuals I ever saw and had been imported from Brazil, I suspect via Holland. They made a lovely pair and I was convinced that I could breed them in a large flight cage. At that time my company transferred me to Chicago.

The *Sporophila* seedeaters fall roughly into three groups: the black-and-white, the grey ones, and the rufous ones. Many of the tiny ones from northern South America have been bred in Denmark and Germany. They are difficult to identify as they breed within the first year, but don't attain full definitive plumage until their second full year; and juvenile-plumaged birds of one species are virtually identical with those of another. They are the size of an Estrildine waxbill. I've found them to be easy to keep in cage and aviary, mixing well, and the aggressive rivalry and singing of fit males being harmless, not disruptive. Nowadays they are rare in captivity. I've not been able to obtain a single one in England over the past three years and would certainly give them priority if I had the chance.

In January, I took part in an expedition to the border between Venezuela and Brazil. There, for two weeks, we caught birds, removed their lice, photographed the birds and recorded various pertinent details, and then released them. In addition to helping with the mist-netting, I took time out to sketch the finches we caught. The Ruddy-breasted Seedeater *Sporophila minuta* is one of the *Sporophila* very common in the open areas, and I was able to paint a range of plumages. I have kept this bird on many occasions. The Plumbeous Seedeater *S. whitleyana plumbea*, however, was new for me. We caught just two pairs and I strongly suspect that one of the apparent females was a second year male as it was very vocal when held.

The feeding of *Sporophila* seedeaters is of great interest to me. Other

writers seem to have different experiences about their need for insect food. Jeffrey Trollope, in his book on breeding finches in 1983, describes them as rearing young largely on insect food. Mr. Albrecht-Muller, one of the greatest bird breeders in Denmark, successfully bred several species in cage and aviary during the 1930s. He said they need sprouting seeds, green seeds and a few mealworms (my experience differs). I have kept about 12 species now and only ever had one that would take mealworms - one individual bird at that. In England last year I had nine pairs of five species, and not one ever showed the slightest interest in mealworms in cage or aviary.

Many years ago I acquired a pair of the Parrot-billed Seedeater *S. (Neorhynchus) peruvianus* and went to great lengths to get data on it in the wild. In one well-detailed field study nestlings were examined after having been fed, and their crops were filled with fresh green seeds (*Avicultural Magazine*, 73[1967], 68-76).



PARROT-BILLED SEEDEATER *Sporophila (Neorhynchus) peruvianus*

I have a trio of the Drab-coloured Seedeater *S. simplex* in my large planted aviary. It is absorbing to watch how they work their way through a shrub, with considerable agility, searching and pecking the undersides of the leaves just like a warbler - apparently taking tiny insects. I've not bred any of these birds in this collection as the aviary is too crowded - and I'm too stupid to resist buying a new species at every opportunity.

I well remember the first time I saw the Rufous-collared Sparrow *Zonotrichia capensis*. I was visiting the Canary Islands, on business, but was determined to find some genuine wild Canaries to take back home to Spain with me. To my delight I saw a pet shop and looked in the window. There, in the window, were three cages but instead of containing canaries they contained a species of bird I'd never seen before. I stared fascinated. If this was a local Canary Island buntingbut the shop keeper assured me it came from South America, and suddenly the penny dropped.

A few years later in Venezuela I caught scores of them and became very familiar with the species. A good friend had many of them come to her garden where she put out fruit and rice every day. First with the use of trap cages, then mist nets, we quickly managed to catch most of the local sparrow population and banded each with a single coloured plastic ring. It was a big surprise one afternoon, when taking tea at another friend's house the two of us spotted a sparrow with a yellow band at the bird table. This set off a real interest in the birds of the neighbourhood among the neighbours, and subsequently this resulted in a successful attempt to work out the territories of the various banded birds.

On my Brazilian border trip I caught quite a few of the Roraima Rufous-collared Sparrow *Z. capensis roraimae* and was fascinated to note the difference in plumage as compared to the Venezuelan race *Z. capensis venezuelae* I was more familiar with. Both Roraima and the Andean race *Z. capensis costaricensis* are duller in comparison. It is the latter which is usually imported from Peru.

Some of the birds in our garden banding study had growths on their feet, and we also found these on another species that came regularly to the feeders, the Ochre-breasted Brush-finch *Atlapetes semirufous*.

I took some of these birds home to keep for a while to see whether I could cure them. I must admit that I am not the Birdman of Alcatraz, or anywhere, and after a while I decided that I could not effect a quick cure, but neither did the condition seem to be contagious. My theory, however, was that the birds were eating too much plain white rice - and milled white rice has virtually no food value at all. The only other birds that gorged on the rice were the doves and cowbirds, neither of which seemed to have any foot problems.

A plague of cats put paid to the bird feeding for about two years, by which time I'd left Venezuela to live in Chicago. I returned for a holiday however, and went up into the hills to see my friend. She had begun feeding the birds again, two ferocious dogs having completely cured the cat problem. This time no rice, only fruit, wholemeal bread and a little millet seed. My friend was keen to repeat the banding operation and we set some mist nets and managed to catch several of the local birds which

we again banded. To our delight there was not one case of bumble foot, and we caught two birds that had been banded before, one four years earlier.

It seems crazy, but I think those bumblefoot birds had become too dependant on that white rice and were even feeding it to nestlings. There's a lesson there.

The local brush-finch *Atlapetes semirufous* is common and widespread all along the hill country in northern South America, and can often be seen travelling around in small groups. It's the only brush-finch I know that forages in the upper reaches of bushes and small trees; I've seen it 10 to 15 ft (3.04 - 4.57 m) above ground. It is beautiful, sings well - but wouldn't win any prizes - and is very easy to keep in cages where it steadies down quickly. It would make an absolutely perfect aviary bird and one I'm sure would breed well given suitable conditions - thick shrubbery with peace and quiet.

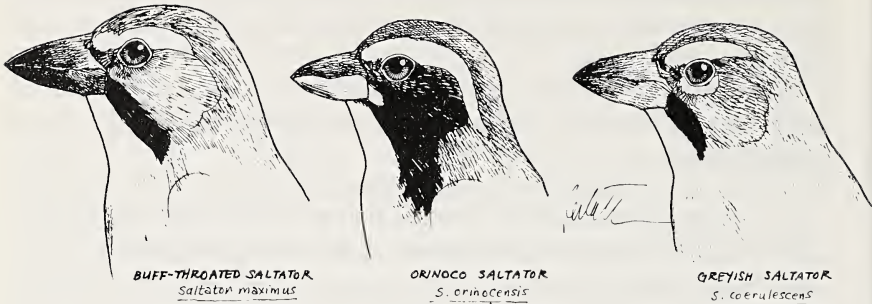
But to the best of my knowledge, it has never been seen in aviculture outside my personal experience.

Many is the time, while sitting still and silent in the rain forest, waiting for birds to come along, I've heard the regular rustle of a brush-finch as it has worked its way over the floor of the forest, kicking leaves aside with each hop, picking up seeds and insects.

In studying these species in the wild, and in large cages where they've been kept with other birds, large and small, I've never seen any aggression between adult birds - nor indeed by any brush-finch ever. They seem to live mainly on seeds, but will take a little softbill food, fruit and greens, and any mealworms or other insect life. The immatures stay in the company of their parents until fully moulted into adult plumage. I have now kept several species of brush-finch since my early experiences with the Ochre-breasted and will write a full length article about them sometime. Meanwhile, if any reader has any experience with any of the genus, I'd be delighted to hear from him or her.

Another group of birds common in the neo-tropics are the saltators. After discovering that a persistent songster outside my bedroom window was a Greyish Saltator *Saltator caeruleus*, I wrote to my old friend (now the late) Herbert Murray. Herbert was undoubtedly the most experienced man in England with tanagers and South American seedeating birds. To call a Greyish Saltator a finch may seem odd if one thinks of a canary as being the definitive finch, but this big creature is as much a finch as any other bird I've mentioned here. I caught one of these biggies. It fed on papaya, mango, lettuce and everything in the food tray, but no seed.

My careful observations of the bird in the wild seemed to suggest that



it fed almost exclusively on buds, leaves and fruit. It was big, and a little dull and I soon released it once I'd made a coloured sketch for future reference. Old Herbert wrote back something like this, '.....one of the duller birds I've ever kept. The pair lived for years - doing nothing except eat, and they seemed to eat a bit of everything and anything. When they finally died they went unlamented'.

The next Saltator I caught was a lustrous creature, the Streaked Saltator *S. albicollis*, a truly lovely bird. Being short of space I put him in with a Kiskadee Flycatcher, but he was terrified of his companion and was too frightened to feed, nearly starving to death. I force fed him for two days, with mealworms dipped in multivitamin powder and water enriched with glucose. He recovered quickly and after a short period in a small, covered cage, settled well. But he would only ever eat my own soft food mixture and mealworms - refusing all fruit and seed.

The following year I brought another one home. In contrast to my first experience, this bird settled immediately taking fruit, softfood, seeds and mealworms but really preferring orange to anything else. If nothing else this shows that you cannot draw conclusions from experiences with just one bird. My observations of the bird in the wild indicate a normal diet exactly like the Greyish Saltator - buds and leaves.

Once during our year-round study of the ranch we came across a pair of Orinoco Saltators *S. orinocensis* and watched them feeding for some 20 minutes or so. They were working their way around and through the branches of trees at a height of between 15 and 20 ft (4.57-6.09 m) from the ground. They seemed to be taking insects. A couple of weeks later I spotted a freshly-killed bird by the roadside - a car strike - and was delighted to discover that not only was it an Orinoco Saltator but I'd found it before the flies or the ants had, and it soon went into the freezer to await a time when I could make this sketch. Earlier this year, while driving up the Orinoco valley, I was able to watch another pair of these birds, again

patiently and diligently working their way through the foliage, nipping buds and picking little unknowns and eating them. My last Saltator is the Buff-throated *S. maximus*. We caught a few of them in open scrub forest at the edge of thick gallery forest. I kept one in a holding cage for about 36 hours and it readily took my usual foreign finch seed mixture and drank water, but I was unable to give it a fair trial. I'm sure it would take leaves, buds and fruit.

There are several siskins in South America, including the most famous Red Siskin *Carduelis cucullatus* from Venezuela. This bird is in genuine danger of extinction in our lifetime due to the depredations of trappers for the European bird trade. They are trapped, smuggled out to the small Dutch Antilles islands off the coast of Venezuela, and then flown to Holland. Venezuela has probably the best conservation laws of any country in the world, but the enforcement of the law is another matter and there is big money in Red Siskins. The tragedy of this bird is not so much that it is being taken for aviculture - for it almost isn't - as that it is being taken to hybridise with the domestic canary in the false pursuit of a red canary. I was delighted to learn, during a visit to Australia this year, that it is well established and is breeding regularly. However, the colour has faded and none of the birds there have the strength of red of wild Red Siskins.

Forgive me if I take off on a personal hobby horse for a moment. The *Carduelis* siskins are NOT closely enough related genetically to the *Serinus* canaries for all the eggs in the ovaries to be perfect. Twenty-five percent of eggs laid in every pure Red Siskin x. Canary breeding are dead-in-shell. Mendel's laws of genetics say that there is a lethal factor in the mix, and since no red offspring has ever been produced, it's very obvious that the pure red genetic factor cannot be carried to the totally non-red canary. So the result at best is reddish hybrids which are usually fed with colorants to build the illusion of a near-red canary.

The irony is that there is a true Serin which carries pure red. It is the Red-fronted Serin *Serinus pusillus* from northern Turkey and the southern parts of the USSR. This species is genetically close enough to impart 100% of its red factor to a domestic canary. I've been told the problem is that the black tends to mask the red. Maybe, but what became of the dream to breed a black Canary anyway - like the black tulip? In the range of skins of the Red-fronted Serin in the British Museum collection are a few males with very extensive red; one had the red extending to mantle and flanks.

None of the South American siskins travel well. Many die en route and many of those that arrive die in quarantine. I have advised my friends in the trade not to order them. Of the survivors, the majority are males. This means a frustrated avicultural community, and added strength to the disinterest in South American finches. Why they should be delicate in this

way I'm not sure but in my personal experience I'd say it is undoubtedly the treatment the birds receive during the first few days after being trapped. Shock is a very real factor, and tropical siskins can shock easily. They need quiet, space, very clean conditions with fresh water, a variety of seeds including fresh green millet. The opposite of these conditions will guarantee failure. I have experience of freshly-caught birds appearing to eat normally but under the stress of a noisy bird room going light very quickly, and dying. I believe they live off their body fat and are not eating at all, just cracking seed and dropping it.

The Pileated Finch *Lophospingus pileatus* is a bird that used to be offered years ago, but I don't remember seeing it for many years now. It's fairly common in Venezuela and we caught it quite often, both odd birds, and small family groups. The bright red of the crest contrasts very well with the soft grey body. It is a bird of open forest undergrowth, retiring and shy, behaving much like a bush warbler continually on the move apparently seeking small insects. On two or three occasions I kept it in a holding cage at the campsite, ready for our drive back to Caracas, but it faded very quickly. A bird caught on Saturday morning would be almost dead by Sunday. At first I thought they were suffering from shock, which might have been the case, and they would take no seed at all. I released every one.

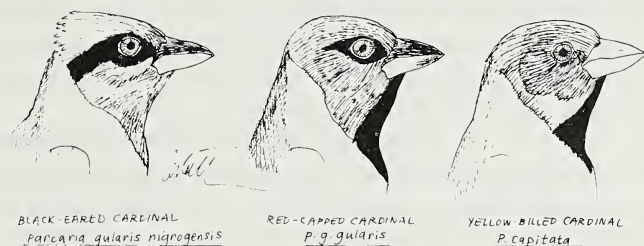
Eventually I decided only to take home a pair of birds that were caught just an hour before we struck for home, and so got them to my bird room within a couple of hours. To cut a long story short, they are not seed-eating finches. To begin with they would only take mealworms, then a little softfood, but no seed. They would search furiously through the seed pots looking for something they never found. They were sold and kept as seed-eaters when I was young, and I'm now keeping my eyes open for a shipment to England to see what they're feeding upon.

Incidentally this is one of the genera of birds we've thought were finches, but which Sibley's egg white protein analysis says is a tanager. Before leaving Venezuela I acquired a pair of Red-crested Finches, a closely-related species, and had no difficulty with them at all. They ate seed from the outset.

There are many cardinals in South America. One is a rare scarlet bird the Phoenix or Venezueland Cardinal *C. phoenicea*, superficially similar to the widespread and common Virginian Cardinal *Cardinal cardinalis* of North America. Unfortunately this bird is delicate, barely surviving in a narrow ecological niche about which virtually nothing is known. During my three years' residence in Venezuela I managed to obtain only two birds, a male and a female, which seemed to pair up satisfactorily. They seemed easy to maintain, in good health with a diet of mixed seeds, a regular

softbill mixture which they enjoyed enormously, an orange every day - that was a great favourite - and all the crisp fruits like apple and pear. Of the seeds they consumed, about half of the volume were sunflower. It was a great sadness to me that I was unable to give these birds quarters to breed in, and we eventually released them in the semi-desert scrubby part of a private ranch.

Herbert Murray had kept a pair for many years, but failed to breed them. He agreed with feeding them as one would a tanager. In his opinion, and I quote,: 'They are easily the most magnificent cardinals, and one of the most splendid and desirable birds I have ever kept'.



The black-eared race of the Red-capped Cardinal *Paroaria gularis nigrogensis* came my way by chance and I found it to be an easy bird to maintain, similar to the Yellow-billed, being peaceful and showy. I also obtained an immature Yellow-billed *P. capitata* and painted it regularly as it grew older, changing from the softly-shaded immature to the clean and bright adult. These birds also were very fond of oranges, took various seeds, and were always first to the mealworm pot. I had several individuals over a couple of years, and found them to be great personalities. They show an interest - often open curiosity - in everything going on around them. I'd say they were very suitable for an aviary or running loose in the birdroom.

And finally a bitter-sweet story of the last of these birds, the Black-crested Finch *Lophospingus pusillus*. I have only kept odd individuals, but Herbert Murray kept and bred it in one of his enormous planted aviaries. He found it to be a bird of low bushes, but would show off well and quickly come close when the mealworm tray arrived. His pair bred naturally, building their own nest in a shrub quite close by a nest of Goldfinches. Unfortunately as both broods grew, the Goldfinches were larger, more visible, and audible - calling for food the way temperate zone nestlings so often will. They were irresistible to the Black-crested Finches who fed the young Goldfinches whole mealworms and anything else they could find. The nestling Black-crested died, but the Goldfinches thrived and fledged

perfectly.

I have kept many more South American finches than mentioned in these notes, and intend to write about them in the future. These notes are intended more as an introduction. I apologise for wandering off into anecdotal reminiscence at times.

In conclusion I have found the neo-tropical finches to be a distinct and different group from either the birds of the northern temperate zones, or the Old World tropical finches like waxbills, munias, weavers and whydahs. They tend to be delicate but will eventually become quite hardy and long lived once settled in suitable permanent quarters. Unlike the finches of the temperate zones in my experience I feel it is not normally essential to provide separate enclosures for each breeding pair, but most of them can be aggressive and breeding hopes may be dashes if they are crowded at all. Feeding requirements are fairly typical with live food usually needed during the first couple of weeks after the eggs hatch.

Most of all, I find the neo-tropical finches are the least known, and with very few exceptions, the least written about of the finches. I believe they provide more challenges and opportunities for aviculturists to make new contributions to our knowledge of birds than any other group of finches from any other part of the world. If these notes have stimulated any reader to consider writing about practical experiences, I will be delighted.

As a postscript, an appeal.

In my well-planted, small garden aviary, at the time of writing, I have two Sierra-Finches *Phrygilus gayii* or *P. patagonicus*. I cannot identify them by race or sex. I suspect I have two females. If any reader has any of these birds, please write to me. Thank you.

* * *

STATUS OF THE LILACINE AMAZON PARROT

Amazona autumnalis lilacina

By ROSEMARY LOW

(Loro Parque, Tenerife, Spain)

In 1986 Ana and Eduardo Asanza of the Catholic University of Ecuador studied the Lilacine Amazon Parrot in the wild, from 29th October to 6th November. The subsequent report was made to Zoologische Gesellschaft für Arten- und Populationsschutz (Zoological Society for the Conservation of Species and Populations). Roland Wirth, an official of that society, passed the report* to me with the request that half the proceeds of anything that I published from the report should be donated to that society. This I have done where appropriate but as the Avicultural Society does not, of course, make payment for articles, I draw members' attention to the existence of this German organisation.

The Lilacine Amazon is not well known in aviculture and, unfortunately, is declining in its limited area of distribution in Ecuador. It occurs only in the central-western part, in the provinces of Guayas and Manabí. The study areas were in the tropical coastal zone, part of the area being subtropical desert with an average temperature of 24°C. Vegetation consists of small, spiny trees and deciduous trees.

This Amazon is found from sea level up to 720 m. Between 200 and 500 m the mean annual rainfall is less than 800 mm and the temperature averages 22°C. Vegetation is dry and deciduous. From 500 to 720 m the vegetation is always green and characterised by cloud forest. There is less than 1,000 mm of rain.

This Amazon was found to be more common up to 300 m during the study period. Groups of 14 birds were observed daily in the Daular zone, flying or perched in high trees such as *Ceiba*. In one hour's continuous observation, 24 birds were seen, generally in groups of three.

In the zone to the north and east observations were rarer. In one hour's continuous observation seven birds were seen and, in the higher zone, none. Some of the local people did not know it; others occasionally saw a few in flight.

In the higher zone there were frequent observations of six to 26 Red-headed Conures *Aratinga erythrogenys* and 10 to 30 Celestial Parrotlets *Forpus coelestis* and Orange-flanked Parakeets *Brotogeris pyrrhopterus*, either flying or perched in high trees.

*Estado Poblacional de *Amazona autumnalis lilacina* en el Ecuador, 1987, Ana Cristina Sosa de Asanza and Eduardo Asanza C.

No Buffon's Macaws *Ara ambigua guayaquilensis* were seen; according to the local people, these were either persecuted or captured. A few had been seen in February and March 1986. The Lilacine Amazon and Buffon's Macaw nest on the lower zone (up to 280 m), in areas dominated by spiny trees, from January to March. They nest in holes in the trunks of high trees (such as *Ceiba* and *Tabebuia donnellsmithii*).

The principal fruit in the diet of lilacina is muyuyo *Cordia lutea* from which its local name of 'lora muyuyera' or 'manglera' (the tree is also known as 'el mangle') is derived. This tree is also used for roosting. Other fruits eaten are mango *Mangifera indica*, *Spondias pourpurea* and species of *Minquartia*. In the western lower coastal zone cultivated fruits, including coffee berries, are consumed.

The Lilacine Amazon was observed most frequently between November and March, coinciding with the breeding season and the fruiting of many plants on which they feed. From about April to September (the dry season) they were less often observed using such roosting sites as sugar cane and vegetation in stream beds, or *Tabebuia*.

Extraction of wood is still occurring in the small remaining zones of native vegetation, mainly Guayacan and laurel, especially in the higher zones. Many summer roads exist, used by wood cutters, which cross these zones. Numerous sites without native vegetation were found where there were large areas of pasture or desert.

Agricultural areas are now extending higher and higher into the mountains. Native vegetation is cut and burned to make way for large areas of banana plantations or for coffee, citrus, cocoa or yucca. Local people cut the trees to produce charcoal. Adjoining cultivated areas provide grazing for goats, donkeys and Brahman sheep.

Exactly the same circumstances apply throughout much of tropical South America, gradually eroding the habitat of hundreds of species of birds and animals.

Illegal trade is also widespread. In Bolivia the species most affected are the Lilacine Amazon, Buffon's Macaw, Orange-flanked Parrakeet and, to a lesser degree, the Red-headed Conure and the Celestial Parrotlet.

Locally a Lilacine Amazon costs between 3,000 to 5,000 sucres (20-35 US dollars), Buffon's Macaw about 6,000 (40 dollars) and the Red-headed Conure 2,000 sucres (14 dollars). Contrast this with the cost of a piglet - 3,000 sucres.

The majority of the birds captured have been ordered in advance. According to the catchers, there are many areas where parrots and macaws were common three to five years ago - but now they are scarce and difficult to capture. In general, trappers are people of few resources and this

activity is a form of subsistence.

Ana and Eduardo Asanza concluded that progressive destruction of habitat and illegal trade (national and international) are the most important factors in the decline of the Lilacine Amazon. Buffon's Macaw is so scarce that it is in danger of disappearing from Ecuador.

They believe that: 1) The volume of trapping must be rigorously controlled; 2) An ecological reserve is urgently required in some zones (for animals and flora as well); 3) A programme of afforestation must be implemented for native trees to prevent further erosion and desertification.

The fact that trade is one of the two significant factors in the decline of the Lilacine Amazon, yet it is a comparatively rare bird in aviculture, indicates that (as with most species with a limited area of distribution) its population is not large. The only justification for keeping the Lilacine Amazon in captivity is, therefore, breeding. As yet, this has been achieved worldwide in probably fewer than a dozen collections. Unless more birds with a similar status to this Amazon Parrot are bred in captivity, bird keepers will continue to be labelled by many as consumers - not as conservationists.

Let me make a plea to those with unsexed or unpaired Lilacine Amazons in their collections to do something about it.

* * *

INTRODUCED AND RE-INTRODUCED BIRDS IN BRITAIN

By DEREK GOODWIN

(Petts Wood, Kent)

It occurred to me, stirred by our fair editor's request for copy ('The woman tempted me' - Adam), that a short account and commentary on some of the species of birds now existing in a free state in Britain as a result of introduction or re-introduction by many might be of interest to some of our members. I have dealt with this subject elsewhere (Goodwin, 1978) but I do not flatter myself that many of my present readers will have read the book in question. To those that have, I apologise for a certain amount of inevitable overlapping here with what I have written in it.

Contemporary opinion of 'experts'(sometimes self-styled) on these matters, or at least, which is perhaps not quite the same thing, of those 'experts' who have power to enforce their views, would appear to be roughly as follows: (1) All introductions of exotic birds or mammals are wrong *unless* the creatures are introduced for 'sport', that is to be killed for pleasure. It is now illegal to introduce foreign species to Britain for any other purpose. Similar views and laws, I believe, now obtain in the USA, Canada and Australia. (2) The re-introduction of locally exterminated (even if long ago exterminated) birds of prey is, however, a good thing, even in the case of species that, when plentiful, were regarded as a nuisance.

So far as birds are concerned there have certainly been some unfortunate introductions into America and Australia, at least in the case of the Starling and House Sparrow. Or so we think, forgetting perhaps that, however different our value judgements in the matter, the homesick emigrants *wanted* to see Starlings and House Sparrows rather than Rosellas and Red-headed Woodpeckers and, like us in comparable situations, neither thought nor cared that their grandchildren might think differently.

If we compare the (so far) successfully introduced birds of Britain with those of the USA or Australia, we at once realise that, in part, very different aims and motives were involved. In all three countries the desire of the sportsmen for new and hopefully 'better' gamebirds and wildfowl for 'sporting' purposes was the motive behind some introductions, but whereas in the USA and Australia homesickness inspired the introduction of many common and plentiful birds of the 'old country', including some that were there regarded as all too-plentiful pests, in Britain no such motive was at work and, apart from those introduced for 'sport', only species remarkable for their beauty and interest or marked difference from native

species were introduced.

I shall confine this article to species that can be considered as established here, albeit precariously in some cases. I shall not include 'failed' species like the Pekin Robin or those that appear to exist only in very small numbers and/or in very circumscribed areas, such as the Egyptian Goose, Crane and Bobwhite Quail. Nor shall I include such native wildfowl as the Pintail and Gadwall, whose numbers and breeding ranges in Britain were greatly and apparently permanently increased as a result of their being introduced into new areas by human agency. Nor shall I include the Common Pheasant, which deserves an article to itself at some later date.

Canada Goose *Branta canadensis*

This strikingly patterned and musically voiced bird seems to have been first introduced in the 18th century as a park ornament. In more recent decades large numbers were presented to the authorities in charge of some London parks as a result of estate owners finding their numbers a bit too much of a good thing on their own grounds and to their being spread about by shooting interests. The Canada Goose does not, however, find favour with all sportsmen because of its tendency to fly disconcertingly low and to become semi-tame unless constantly harried. Details of its history and distribution can be found in the splendid atlases of British birds (Lack, 1986; Sharrock, 1976).

The Canada Goose is now probably our most widely distributed wild goose. Certainly it is the one with the widest breeding range in Britain and the one most familiar to the average person. It has been locally blamed for feeding on young wheat and other crops but does not appear to have (or even to have been accused of having) an adverse effect on other species.

The situation in regard to the Grey Lag Goose might, however, involve competition between them in the future. They now occur together in parts of Kent. Like all other stronger and more pushful species (including the native Mallard) Canada Geese may be formidable competitors with smaller, pinioned waterfowl in public parks where, as is often the case, these are forced to compete for handouts from the public (or starve).

Grey Lag Goose *Anser anser*

This goose is believed to have bred widely in lowland Britain before being gradually exterminated in the wild form by persecution and domestication. By the turn of the century, and for some four or five decades afterwards, it was confined as a breeding species in Britain to parts of northern and western Scotland. In recent years it has been widely intro-

duced, mainly or entirely by shooting interests, into south-eastern England where it is now locally common but on the whole much less widespread and numerous than is the Canada Goose.

I and others have seen apparent hybrids between Greylag and Canada Geese at large in Kent and Surrey. Whether these hybrids were bred in a feral state or bred in captivity and then turned loose, I do not know. All that I have seen were consorting with Canada Geese.

As an aesthetic embellishment to the countryside, the Grey Lag rates about equal to the Canada Goose in appearance though decidedly below it vocally, its voice being little if any more musical than that of its farm-yard descendants.

Needless to say, the continued existence of either this species or the Canada Goose in so densely populated a country as England depends absolutely on a considerable degree of tolerance on the part of both officialdom and private landowners.

Ruddy Duck *Oxyura jamaicensis*

The British population of this quaint but beautiful duck apparently originated in escapees from the Slimbridge collection. There seems reason to hope that the species is now firmly established. It is as yet, however, only locally abundant, mainly in parts of western and southern England, parts of the Welsh border and the Isle of Anglesey (see Lack for fuller details).

An extremely aquatic freshwater duck, needing waters with extensive muddy shallows and reeds or other emergent vegetation, the Ruddy Duck has no congeners here and, it would seem, no serious ecological competitors. Those who object to all introductions on principle have been hard put to find a 'good' stick to beat this one with. So far as I know, the best they have come up with is that its being established here already might, at some distant future date, prevent the establishment here of the White-headed Duck *O. leucocephala* of Western Asia, in the very unlikely event of that species deciding to emulate the Collared Dove and spread westward into Europe.

To which my answer is that the entertaining and handsome Ruddy Ducks *now* on some of our lakes and reservoirs are worth more than any number of the less beautiful White-headed Ducks in some highly hypothetical future.

The introduction of this species was, we are assured, entirely accidental. All those who rejoice to see a Ruddy Drake with his chestnut, white and black plumage and exquisitely beautiful blue bill without having to take a trip to the USA (or even to Slimbridge) to do so will, nevertheless, be forever grateful to those who made such a happy accident possible.

Mandarin Duck Aix galericulata

The Mandarin Drake, as most of my readers will know, is one of the most beautiful ducks in the world and also the strangest in appearance, with its hackled neck and enormously enlarged inner webs of the two innermost secondaries, which stand up like little sails when the bird is at ease and still more when he is displaying.

Although not so abundant and widespread as the Ruddy Duck, the Mandarin has been here much longer as a wild-living bird. I first saw it when I was nine, in 1929. Windsor Great Park and nearby areas of Surrey and Berkshire were then, and still are, its headquarters but it has spread somewhat and Mr. Andy Davies, who has made a long-term study of it, has shown that its numbers may be significantly increased by the provision of suitable nesting boxes.

Elsewhere in England and in the one locality in Scotland where it occurs, local populations appear usually or always to be based on some waterfowl collection.

The Mandarin needs a combination of water - lakes, ponds, slow-flowing streams or canals - and woodland with hole-containing trees (although, as has been said, nest-boxes can replace natural tree holes) and with plenty of oaks and sweet chestnut trees. Acorns and chestnuts, taken from the ground and, more especially, from the bottom of shallow water, are usually the main winter foods. Beech nuts are also taken and probably preferred when available but, at least in Kent and Surrey, most beech trees seem only to bear a crop of nuts once in several years, though in the intervening years they often bear crops of a kind of false nut consisting of an empty shell with no kernel.

Waterside cover, especially of overhanging Rhododendrons, is also liked by Mandarins and may be essential for successful breeding. The type of habitat apparently needed by Mandarins is limited and, like most other habitats, ever threatened by forestry and building interests. True there are many areas of suitable habitat as yet unpopulated but to get to them the birds would have to fly 'on spec' over much unsuitable ground. This they seem usually, and understandably, reluctant to do, though there are a few records of such distance flights. Notably that of two ringed Mandarins that flew from Norway to Northumberland, where they were promptly shot.

Of all our introduced species there is none of more value, on both aesthetic and conservational grounds. Much less abundant and widespread than formerly in its natural Far Eastern range and at least potentially threatened there, its continued survival might, as K.J. Herber truly says (Lack, 1986), one day depend on the British population. As a living ornament it has few equals, and although, like other birds that are shot for

sport or food, it is usually shy of man, where it sees him frequently and is *not* persecuted by him it soon becomes relatively unperturbed by his presence and gladdens the eye of the ordinary passer-by as well as the bird-watcher with binoculars.

It has been estimated (Davies, 1985) that there may now be as many as 850 to 1,000 pairs of Mandarins at large in Britain. This may seem a lot but even if, happily, not an over-estimate, it is still a very vulnerably small number.

I would like to think that this lovely bird will 'go from strength to strength' in Britain and hope that I am wrong in fearing it is unlikely to do so. But it has much against it. Lack of suitable *contiguous* habitat I have touched on above. Judging from the relatively few well-grown broods I have seen, Mandarin ducklings would appear if anything even more threatened by predation and/or other forms of mortality in their early weeks than those of other species. When I have seen a duck with well-grown young these have usually numbered only from one to three. The adults, like our other ducks, are shot for 'sport' but happily at least some of their haunts are unfrequented by sportsmen.

There seems another and potentially devastating threat to our Mandarins in the recently introduced (or re-introduced) Goshawk *Accipiter gentilis*. In Europe, this species is known often to specialise in catching Stock Doves *Columba oenas* and Black Woodpeckers *Dryocopus martius* by lurking in cover nearby until they visit or return to their nest holes. It is known to exterminate local breeding populations of the Stock Dove (possibly also of the Black Woodpecker) in this way in woodland which provides cover for the hawk within suitable distance of the holes. If, when its numbers increase (as they appear to be doing), the Goshawk adapts this behaviour to nesting Mandarins, then the latter will almost certainly soon be wiped out here. The more so as the Goshawk is stringently protected while the Mandarin is still considered a legitimate object of 'sport'.

Any mass introduction of the Wood or Carolina Duck *Aix sponsa*, would also pose a potential threat to our Mandarins. This species, which is apparently breeding locally in small numbers in a more or less feral state (Sharrock) has similar ecological requirements and would be bound, if it did succeed, to do so only as a result of successful competition with the Mandarin. Both are lovely birds but I think all our efforts should be to tip the balance in favour of the Mandarin. The latter is threatened in its native haunts whereas the Wood Duck is not as, although it is shot for sport (is there any creature so beautiful that sportsmen would not get a thrill from killing it?), there are many in the USA with its interests at heart and, although not a 'common object' in its native haunts, it seems now to be in safe numbers there.

Sea Eagle or White-tailed Eagle *Haliaeetus albicilla*

This bird, spectacular for its size if not for any particular grace or beauty, was for long an inhabitant of the coasts of northern Britain, being mentioned in one of the earliest extant Anglo-Saxon poems.

It was, whether with or without any justification I do not feel qualified to judge, persecuted by shepherds, crofters and sportsmen and, with a little help in the later stages from skin and egg collectors, finally exterminated here. It is said (Goldsmith, 1864) that in Orkney eagles (probably of this species) were considered so harmful that anybody who killed one was entitled to a chicken from every house in the parish.

The re-introduction of this species was a project conceived and executed by the Nature Conservancy Council (Sexton, 1987). From 1975 onwards numbers of young Sea Eagles were procured from Norway each June, kept on the Isle of Rhum through the summer and released there in the autumn. The first known successful breeding of a pair of these birds took place in 1984.

It is perhaps too early to speculate whether this project will fully succeed and, if it does, whether any drawbacks will attend the results. Obviously life will be made more hazardous and violent death more frequent for some other forms of life, among them the sea ducks and divers. If any of the released Sea Eagles have lost their fear of man, they might prove dangerously bold if confronted with some person wittingly or unwittingly approaching their nest or, if hungry, with a very small child. However, it is, I should think, fairly sure that those responsible will have foreseen and taken steps to forestall any such possibilities.

One thing is certain and that is that very many birdwatchers, unlike myself, find birds of prey more attractive than those of other families and, if the Sea Eagle project succeeds, will consider their outings on or around the west coast of Scotland (and later, no doubt, elsewhere as well) greatly enhanced by the presence of this immense raptor.

Goshawk *Accipiter gentilis*

It seems less certain that this species, as its admirers claim, was once a genuine member of our avifauna, for the habit of releasing birds of prey in the hopes that they will breed locally goes back to distant days of mediaeval falconry, to say nothing of the numbers of trained birds that falconers, ancient and modern, not infrequently lose. True the Goshawk breeds widely in western Europe but so do some other species that have not yet (so far as is known) ever bred in these islands.

Be that as it may, the Goshawks now living and breeding in Britain are known (Marquiss and Newton, 1982) to have their origin in birds deliberately imported for falconry or scientific studies and which escaped or (the

majority) were deliberately released. Although private individuals (one in particular) appear to have been directly responsible, officialdom granted permits for the importation of the birds and would appear to have been firmly behind the project.

This is the only one of our introduced or re-introduced species which I think might better not have been brought to these islands. Aesthetically, the bird is just a big, rather dull-coloured Sparrowhawk. From a conservation standpoint, as it occurs widely across much of the northern hemisphere, it is in no need of having its range artificially extended. It is well known to be most destructive of free range poultry, more conspicuous hawks such as the Buzzard in Europe and the Red-tailed Hawk in the USA being often mistakenly blamed for its depredations. It takes a wide range of prey, both birds and mammals so that there can be no check on its population if it seriously depletes the numbers of particular species. In Britain its diet includes such relatively rare and/or decreasing species such as the Black Grouse *Tetrao tetrix*, Red Squirrel *Sciurus vulgaris* and Grey Partridge *Perdix perdix*.

It is admittedly said to be no danger to the Grey Partridge (Potts, 1986) but some disagree with this verdict. I am assured by a very competent ornithologist that it is responsible for local extermination of the Capercaillie *Tetrao urogallus* in Germany.

Much has been made of the numbers of Wood Pigeons taken by the Goshawk but *in relation to the existing numbers of different prey species*, there is no evidence for any preference for, or particular success at catching this species even although the male Goshawk is said to be able to fly down pigeons in chases over a long distance in the open sky (Nicolai, 1982) a remarkable feat (if it is always successful) for an *Accipiter*.

The Goshawk is known to be aggressive towards other large birds of prey (smaller ones, like the Sparrowhawk, it includes in its menu). It may well make life more difficult for these when they exist or try to exist in the same neighbourhood. This is apparently especially so in the case of the Honey Buzzard *Pernis apivorus*, which avoids and/or is driven away from areas inhabited by the Goshawk (Kostrzewa, 1987).

All in all, I think that the Goshawk's introduction seems likely to result in a decline in numbers of such native species as the Red Squirrel, Black Grouse and Stock Dove, and to have similar, or even worse effects on the Capercaillie and Mandarin Duck.

Golden Pheasant *Chrysolophus pictus*

This beautiful and interesting species has often been introduced, mainly one supposes by aviculturists captivated by its beauty, since its lack of 'sporting qualities' have generally made it disliked by sportsmen. Its dis-

tribution is scattered and local, with the main populations in the Brecklands of Norfolk and Suffolk, the South Downs in Hampshire and West Sussex and part of south-western Scotland (Ridley, in Lack).

In Britain Golden Pheasants inhabit conifer plantations where the trees are between 10 and 30 years old and exclude much of the light so there is no undergrowth, or in mature Yew forest with similar bare ground and gloom beneath the trees. As the birds are, it appears, though derived from semi-tame captives, extremely shy of man (Colin Harrison, *pers. comm.*; Ridley, in Lack) it is clear that he must be, or recently have been a major predator on them.

Nothing appears to be known of the Golden Pheasant's breeding habits in the wild in Britain.

As many of my readers will know, Golden Pheasants in an aviary or when at liberty in a garden, do not avoid small open areas. If, therefore, the introduced population were ever to increase and spread, it could, *if not persecuted by man*, become a delight to the eyes of all who appreciate bright and lovely birds.

What effect the Goshawk will have on its as yet small numbers (estimated by Ridley as 'perhaps 1000 to 2000') remains to be seen. In the habitat described for them they may well be at little risk but if, as I suspect may be the case, they do, in fact, come into rides, paths and other more open areas when people are not about, they may prove highly vulnerable.

Amherst Pheasant *Chrysolophus amherstiae*

Many attempts have been made to introduce this magnificent bird (Lever, 1977; Sharrock) but the only (possibly) viable present population appears to be in adjacent areas of Hertfordshire, Bedfordshire and Buckinghamshire in southern central England (Ridley, in Lack).

Because of its 'poor sporting qualities' attempts have been made to exterminate it (Sharrock) but, happily, have failed. This should be no cause for complacency by the bird's admirers since with a species present in such small numbers (estimated by Ridley at 200 to 500) and one which does not and cannot fly far when alarmed, any even moderately efficient attempt to exterminate it *could not possibly fail to succeed*.

The habitat choice of this species in Britain is similar to that of its congener the Golden Pheasant (q.v.).

The presence of feral populations of these two wonderful birds ought to be welcomed unreservedly. There is, it is true, the possibility that if both increased and spread they would meet and hybridise, as have the *Alectoris* partridges and the various races of the Common Pheasant. This would be a pity although a hybrid population would be better than none at all. In any case in the, unfortunately improbable, event of either or both

species so increasing and spreading, it will then be time enough to consider whether any humane and non-lethal measures could be devised to keep their populations apart.

Both have very small world ranges, with the potential danger that this must ever entail for a species, especially in a modern, man-controlled and man-dominated world. The establishment of feral populations of either or both away from their homelands is to be recommended. It is often said that they are safe enough as they are widely kept and breed well in captivity. This is, however, to put overmuch faith in our fragile western civilisation continuing. Only if many people are living at what is by world standards a pretty high standard, are they likely to be able to keep and breed pheasants, *if* they wish to do so. We have only to look around to know that the relatively affluent and humane nations are threatened by the ever increasing successes of their criminal elements, while elsewhere tyranny, religious intolerance and famine increasingly prevail.

Red-legged and Chukar Partridges *Alectoris rufa* and *A. chukar*

As I have recently written pretty fully on these two species in our magazine (Goodwin, 1986a and 1986b) I will not say much more here. Recent information suggests, I am sorry to say, that most birds now extant in England are hybrids. Sporting interests are also applying for a further extension of official permission (which otherwise expires in October 1988) to release unlimited numbers of Chukars and hybrids yearly. So there seems to be very little hope of the continued existence of *A. rufa*, or its phenotypes, in Britain or, for that matter, in France or northern Spain. I have, however, heard on good authority (T. Gullick, *pers. comm.*) that in central and southern Spain there has, so far, been little or no introduction of Chukars and the partridges which there exist in appreciable numbers are all pure Redlegs.

Capercaillie *Tetrao urogallus*

This very large and handsome woodland grouse became extinct in Scotland (and Ireland) in the late 1700s, presumably owing to deforestation and human persecution.

It was successfully re-introduced in the early part of the 19th century, notably by Lord Breadalbane at Aberfeldy in Perthshire. Although in the 1950s and 60s it was regarded as 'vermin' by forestry interests, because of its eating pine shoots and needles, it is now regarded as a valuable 'sporting bird' and shot for pleasure and the profit of those letting the shooting rights. It has, not surprisingly, declined in numbers over the past few decades and may well decline still more now that it has Goshawks as well as foresters and sportsmen to contend with.

Like its smaller and even handsomer congener, the Black Grouse, it has also declined greatly through much of its world range (Moss) so that it will be a pity, on conservational as well as aesthetic grounds, should it again become extinct in Britain, as it probably will.

Little Owl *Athene noctua*

We owe the presence of this delightful small owl, with its squat figure, piercing pale yellow eyes and bobbing postures, to many people, some of them aviculturists who went to much expense and trouble to introduce it in the latter part of the 19th century (Lever; Sharrock).

Now, as with other long-ago introduced species, the Little Owl is generally accepted as a desirable addition to our fauna, but I am old enough to remember when the outcry against it was similar to but greater than the fulminations now emitted against the Rose-ringed Parrakeet. It was accused of wholesale slaughter of gamebirds and songbirds and the findings, of a meticulously careful scientific enquiry, that it fed, on the whole, mainly on invertebrates and small mammals, was dismissed scornfully as 'whitewashing by the paper naturalists'.

It has decreased much since its hey-day in the late 1930s, probably mainly as a result of our worsening climate, possibly also to changed farming methods and destruction of old trees in parks and farmlands, but is still not uncommon in some areas of lowland Britain. Although welcome on aesthetic grounds, the tiny British population is of no conservational interest as the species is found in central and southern Europe, Asia and north Africa and is abundant in many parts of this wide range.

Rose-ringed Parrakeet *Psittacula krameri*

This handsome and hardy parrakeet was put on the 'British List' as recently as 1983, as a Category C species, that is 'an established feral bird which is self-maintaining'. This I fear may yet prove to be an over-optimistic assumption, at least from the point of view of those who welcome this beautiful and very 'different' addition to our avifauna. One, moreover, that does not, like the Golden and Amherst Pheasants, tend to dwell in distant and often private woodlands but shows itself conspicuously and freely in suburbs and human-frequented parts of the 'Green Belt' around London.

Our local population, about which I wrote in our magazine (Goodwin, 1983) has since sadly dwindled. For the past 18 months I have never seen more than three individuals at one time and for the past two months never more than one. However, it appears (Hawkes, in Lack) that the bird is still present in many London suburbs, in south-eastern Kent and sporadically elsewhere. Hawkes estimates about 1,000 birds but suggests

that the species 'is under recorded'. My own opinion is that most estimators of birds' numbers tend to *over*-estimate them and that this is especially the case when noisy, conspicuous birds such as parrakeets, woodpeckers or jays are involved. When there were at most about 24 Rose-ringed Parrakeets in my area I heard their numbers grossly over-estimated on several occasions. One official solemnly assured me that there was a flock of 200 or more in one wood and the same in another. Not wanting to get myself in officialdom's bad books, I felt it wiser, if uncourageous, not to contradict this absurd statement.*

In contrast to the drooling delight of some ornithologists (falconers *manqué*?) over the re-introduction of the Goshawk, some of them have taken a very dim view of this lovely newcomer, stressing its potential ability to damage crops and giving the impression that they would like officialdom to start a campaign against it.

Though its beauty and its membership of a family of birds not otherwise found in a free state here made the Rose-ringed Parrakeet an acquisition to our avifauna, like the Little Owl it has large populations in its natural range (in its case in India and Africa) so that self interest rather than conservational reasons must prompt us to welcome and help it here. Whatever it may do in the way of making a nuisance of itself to third world peasant farmers without firearms or modern poisons, it is very unlikely that it could be more than a minor nuisance here or could not soon be exterminated if it were.

*I am pleased to say that in the past month I have seen seven, and a friend of mine eight Rose-ringed Parrakeets locally (written 24th November 1987).

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NEWS AND VIEWS

From Rosemary Low:-

The first successful European breeding of a Kiwi occurred at Frankfurt Zoo (West Germany) this year - after nearly a decade of trying. A pair which arrived there from New Zealand in 1978 produced only infertile eggs. In 1984 another two were obtained from the National Kiwi Centre in Otorohanga.

Usually Kiwis can be sexed by the heavier weight of the female and by her longer, more curved beak. However, the second pair could not be sexed with certainty using this method. Wilhelma Zoo (Stuttgart) were also uncertain of the sex of their Kiwis so each zoo exchanged one bird in March 1986.

Last autumn the male hatched a chick which died soon after. In Kiwis only the male incubates. The female contributes what is perhaps the most enormous egg relative to body size of any bird. An egg from a Kiwi laid at the National Kiwi Centre weighed 415 g and measured 126 x 76 mm. It represented over 19% of the female's post-laying weight.

At Frankfurt Zoo the female's second egg was laid on 15th January and was placed in an incubator. It pipped after 64 days and hatched four days later. The chick weighed 255 g.

Kiwi chicks have very large yolk sacs which nourish them for two weeks after hatching. During this period they lose weight - and Frankfurt Zoo's Kiwi dropped to 178 g before it started to gain weight. Food consisted of small worms (similar to earthworms) and small beetles.

* * *

Dr. Brian Kendall writes:

I was saddened to learn of the death, some time ago in Western Australia, of Tom Spence, aviculturist, naturalist and member of this Society since 1952.

He and I became colleagues and friends at the Central Veterinary Laboratory in the immediate post-war years and we joined the Avicultural Society at around the same time. Tom had qualified as a veterinarian at Edinburgh in 1943 but he had some additional training and worked as a veterinary entomologist at the Laboratory at Weybridge covering also the parasitic ticks and mites responsible for animal disease and we briefly collaborated in work on a tick-transmitted disease of cattle. After a few years at Weybridge, following his father's death, Tom resigned to take over the family business and farms in Fife, Scotland. His next move was to be Director of the Zoo at Perth, Western Australia, where he remained

until shortly before his death in 1985. I remember a somewhat liquid farewell dinner before he left for Australia and two or three ecstatic letters after he arrived. Thereafter, correspondence waned although I did have a long and characteristic letter from him in 1983.

My friendship with Tom essentially covered the years when he was at Weybridge and had a small collection of birds at Send and those when he lived at Dunbog in Fife and had an ever-increasing collection of miscellaneous livestock including cheetahs, which he took shopping in the back of his car, and gibbons from which he contracted obscure helminth disease.

Tom was a good veterinary surgeon who applied his special training to his hobby animals, something which I have usually failed to do. He was a superb field naturalist, certainly the best I have ever met, and those who had the good fortune to be entertained at Dunbog will remember him as a thoughtful and generous host.

He was awarded the Society's Medal for the first breeding in Britain of the Purple-capped Lory *Lorius domicellus* in 1954, and served as a member of the Council of the Avicultural Society from 1960-64 inclusive.

It is worth recording what I feel were the major events influencing his life; firstly, his early meeting with J.C. Laidlay of Lindores, Fife, from whom he acquired a life-long interest in wildfowl, and secondly a sabbatical year in Australia when he developed a love for the country from which he never recovered.

* * *

Several very interesting reports of apparent first British breedings have been received by the Editor and full accounts of all these will appear in future issues of the Magazine. They include the Collared Sunbird *Anthreptes collaris* by Mr. A. Ridd of Exeter, and the Celebes Mynah *Acridotheres albocinctus*, the Green-winged Trumpeter *Psophia viridis*, and the Celebes Pied Imperial Pigeon *Ducula luctuosa* by Mr. and Mrs. J. Ridgeway. The Ridgeways have also prepared an account of their breeding in 1984 of the Coledo Mynah *Sarcops calvus* which is believed to have been the first time this species was bred in Britain; Mr. R.F. Rayner bred this species in 1985 and wrote an account of this in the *Avicultural Magazine* (1986, No. 1, page 8). Let us hope that more members will while away the long winter evenings by writing for the Magazine.

We have received a copy of the latest British Isles Regional Stud Book for the Rothschild's Mynah *Leucopsar rothschildii*. It is the second to be

produced and includes the breeding results from 1986, the first year of the breeding programme. The total population recorded was 110 on 31st December, compared to 101 at the end of 1985, but it is pointed out that much of this increase is due to imports rather than to breeding success and that the population cannot be regarded as self-sustaining at present. The Stud Book is in two sections: firstly, a complete historical list of the British population in Stud Book number order; secondly, a list of all living individuals in alphabetical order of their present location.

We have been asked to encourage those of our members who keep these birds to make a return for 1987 and requests for questionnaire forms and any other enquiries about the Stud Book should be addressed to Dr. Georgina Mace, The National Federation of Zoological Gardens of Great Britain and Ireland, c/o The Institute of Zoology, Regent's Park, London NW1 4RY (Telephone 01-722 3333). Even if members are not interested in participating in any co-operative breeding programme, it would be useful for the Stud Book to have information on their birds, as it provides valuable baseline data about the genetic history of the British population and about rates of breeding and survival. (Ed.)

* * *

CORRESPONDENCE

What is the world's most abundant bird species?

In the *Avicultural Magazine* (Vol. 93, 1987, No. 2) I was interested to read of the Sooty Shearwater *Puffinus griseus* and its estimated population size of 'a thousand million'. This phenomenal number clearly made the Shearwater a candidate for the world's most abundant bird species. But surely this distinction belongs to the Red-billed Quelea *Quelea quelea* of Africa - the feathered locust of our African savannas?

Twenty years ago, at a Symposium of the Institute of Biology, J.H. Cook and P. Ward suggested that the total Quelea population of Africa might be between one thousand million and one hundred thousand million. Since then, of course, there has been a terrific expansion in the production of small-grain crops such as wheat, rice, sorghum and millets, and also in irrigation of winter crops. In Zimbabwe, for example, we now crop about 40,000 hectares of irrigated winter wheat, when 20 years ago we cropped only 1,000 ha. More crops, especially winter crops (when natural grass seed is in short supply), probably mean more birds.

In 1985 we killed an estimated 120 million Queleas in crop protection operations in winter. I assume that this number was one-half (or less) of the total population in Zimbabwe at that time. Twenty-two countries in

sub-Saharan Africa have a *Quelea* problem, and our proportion of this area is perhaps 6%. Could this suggest that the Red-billed *Quelea* numbered four thousand million?

However, the *Quelea* population fluctuates dramatically from year to year; in a good rainy season it could increase four-fold through reproduction. No doubt the numbers of the Sooty Shearwater are very stable by contrast.

Dept. of National Parks
P.O. Box BE60
Belvedere, Harare, Zimbabwe.

Peter J. Mundy

* * *

The Problem of the Penny-Slamming Cariama

Aviculture has always been of value in the study and understanding of bird behaviour. Apart from the obvious advantages of close observation, the fact that a bird will try to carry out innate patterns of behaviour in circumstances that are not ideal for it, while this is undoubtedly annoying for the bird, may provide useful clues about the origin and functions of some aspects of its behaviour.

In the 1960s I used to make use of the then greater variety of birds at the London Zoo in studying comparative aspects of bird behaviour. On a number of occasions I had the pleasure of seeing some of the collection in the company of John Yealland who was at that time Curator of Birds. On one such occasion we visited a row of aviaries where a number of larger birds were kept, including a *Cariama* or Red-legged Seriamia *Cariama cristata*. This is one of the odd birds of the crane and rail order Gruiformes and looks something like a long-legged and overgrown wader. It is mainly terrestrial in habits. It has a short, stout and slightly curved bill, carried with the head uptilted to give it a slightly supercilious expression that is enhanced by the upstanding tuft of bristly feathers on the forehead.

John commented that it had a rather odd habit. He produced a penny. I suppose one should explain that the old penny was a bronze coin about 3 cms in diameter, close in size to our present 10p piece. He offered the penny to the *Cariama*, which seized it. It walked a few steps, abruptly reared up and threw its head well back, then brought it forward suddenly, releasing the penny which was slammed down on the concrete floor of the aviary so hard that it ricocheted across it. The bird hurried forward, seized the coin again and repeated the process. We walked on to inspect the other aviaries with the distant sound of a coin repeatedly ringing against concrete.

Presumably there is something that the *Cariama* usually encounters in

the lowlands of South America that looks something like an old penny. If repeatedly dashed against a hard surface it presumably becomes edible; but I still don't know what it can be. Perhaps someone else can provide me with the answer.

48 Earl's Crescent,
Harrow, Middlesex, HA1 1XN.

Dr. C.J.O. Harrison

* * *

AVICULTURAL SOCIETY NEWS

First Breeding Awards

At its meeting on 25th October 1987, the Council approved the award of the Society's Certificate of Merit to Mr. and Mrs. R. Mann who hand-reared the following species for the first time in Britain, no prior claim having been notified:-

- Red-topped Amazon Parrot *Amazona dufresniana rhodocorytha* in 1980
- Palm Cockatoo *Probosciger aterrimus* in 1984

Autumn Lunch

On Sunday, 25th October, over 50 members and their guests gathered in the new meeting hall at the Society's headquarters at Warren Hill, Hartley Wintney, and despite its unfinished state, the accommodation is very spacious and proved well suited to meetings such as this.

After a buffet lunch, Mr. David Alderton gave a very interesting talk entitled 'Aviculture: Does it have a Future?'. Mr. Alderton, who is a member of the Council of the Avicultural Society and the author of several books on aviculture, made many very apposite points about the role of aviculturists in the future and a most stimulating discussion with the audience followed. The talk was illustrated by some very beautiful slides taken by the well-known bird photographer, Tony Tilford.

We would like to thank Mr. Alderton and Mr. Tilford for giving us such an interesting lecture.

Future Meetings

Saturday, 19th March 1988 - Lunch and lecture at Warren Hill, Hartley Wintney.

Sunday, 5th June, 1988 - President's Garden Party at Chestnut Lodge, Cobham, Surrey, by kind invitation of Miss Ruth Ezra and Mr. Raymond Sawyer.

A meeting will be held at Hartley Wintney in October 1988, on a date yet to be fixed.

It has proved very difficult to fix a date for a dinner and that arranged for 12th December had to be abandoned as it clashed with the National Show which many of our members attend. We are now hoping to arrange a dinner for a Saturday night in June or July 1988, in London, and will announce details as soon as known.

Hon. Secretary

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AUTHORS AND PUBLISHERS are welcome to contact Neville Brickell (Avicultural Research Unit, 100 Innes Road, Durban 4001, Natal, South Africa) for data or photographs of southern African birds for publication.

The Editor does not accept responsibility for opinions expressed in articles, notes, reviews or correspondence

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BEING THE JOURNAL OF
THE AVICULTURAL SOCIETY

Edited by
MARY HARVEY

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JEAN DELACOUR MEMORIAL ISSUE

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THE AVICULTURAL MAGAZINE welcomes original articles that have not been published elsewhere and that essentially concern the aviculture of a particular bird or group of birds, or that describe their natural history. Articles should be preferably typewritten, with double spacing, and the scientific names as well as the vernacular names of birds should be given. References cited in the text should be listed at the end of the article. Line drawings should be in Indian ink on thick paper or card; black and white photographs which illustrate a particular point in the article will be used where possible and should be clearly captioned. If authors wish their eventual return, they must say so when submitting the article and write their name on the back of each photograph.

ADDRESS OF EDITOR

Mary Harvey, Honorary Editor, The Avicultural Magazine, Warren Hill, Hulford's Lane, Hartley Wintney, Hampshire RG27 8AG, England.



New York Zoological Society
Dr. Jean Delacour - taken during his years at the Bronx Zoo in the 1940s

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JEAN DELACOUR MEMORIAL ISSUE

JEAN THEODORE DELACOUR 1890-1985

By RUTH EZRA

President, The Avicultural Society
(Chestnut Lodge, Cobham, Surrey)

The death of Jean Delacour left a gap in my life and in the lives of so many others that no one can ever fill.

I had known him all my life, in fact he knew my father before his marriage in 1918 when my father was living in London in a flat in Mount Street, Mayfair. They were devoted friends, both being interested in aviculture and his visits to our home at Foxwarren Park, Cobham, were looked forward to greatly. My father was thrilled to hear about Jean's many foreign trips. He also came regularly to No. 17 Knightsbridge, our London home, and we all loved seeing him as, in addition to his great knowledge and love of life, he had a great sense of humour which enabled him to make friends with many people. He never forgot funny little incidents or remarks that amused him, however long ago they had happened.

Apart from his life of travel and collecting for his fine chateau at Cleres, near Rouen, he was also keenly interested in pictures and music and had a fine voice. He had been trained as an opera singer and though he found Bach, Beethoven and Brahms very boring, he loved the music of Russian composers such as Moussorgsky, especially his opera *Boris Godounov*. I well remember accompanying him on the piano as he sang favourite arias at musical gatherings in our home. He was a man of towering structure, in appearance rather like Winston Churchill.

His widespread knowledge of birds can be read in his many books and he was also a great authority on plants, knowing not only their natural history but also who first discovered them and how they were established in horticulture.

Twice in his life he lost his home. When he returned from World War I he found the family chateau and aviaries at Villers, near Amiens, had been

completely destroyed and he then bought the Chateau of Cleres. During the winter of 1919 he employed over one hundred men who lived under canvas whilst they dug the lake and made the aviaries, enclosures and gardens ready to move all the birds into by the spring. This work was completed in six months, mainly by hand as there were few mechanical aids then - an amazing feat when one considers the difficulties of creating a park now. Unfortunately Cleres was very badly damaged in World War II and had to be recreated when Jean returned there from America after the war.

Raymond Sawyer and I enjoyed many visits to Cleres, sometimes accompanied by Dr. Edward Hindle and Miss Phyllis Barclay-Smith (editor of the *Avicultural Magazine* from 1939 to 1973). Being a Frenchman by birth (he took American citizenship after the Second World War) he was a great connoisseur of food and drink and we all enjoyed the fine wines and wonderful meals provided by his excellent French housekeeper. One of the most beautiful views there was from the chateau looking down on to the wonderful collection of waterfowl on the lakes. There were also many tastefully planted aviaries which over the years housed so many rare birds collected by Jean. In the early evening, when the park had closed to the public, we used to walk around the grounds and sit by the lake. The herds of Blackbuck and wallabies and various tame waterfowl would appear and come up to be fed by Jean on pieces of bread that he pulled from his pocket. A beautiful and peaceful scene that remains one of our most lasting and treasured memories.

When we started our collection here at Chestnut Lodge in 1971, Jean Delacour continued his stays with us whenever he came to England, at least once a year. When he arrived he would ask, 'What are we going to do this year?', as though he were building his own collection again at Cleres, then long completed. Even towards the end of his life it was hard to realise when talking with him, that he was well into his nineties, such was his youthful enthusiasm.

Jean Delacour was the avicultural ambassador to the world, being the great link between ornithology and aviculture. In London in 1922 he was a co-founder of the International Council for Bird Preservation which has achieved so much for international bird protection, and was its President from 1938 to 1958.

All his life he was the Avicultural Society's greatest supporter and publicist. He loved being its President and used to attend meetings whenever possible. Not only was he a member for longer than anyone else, from 1916 until his death, but he must also have contributed the most articles to the *Avicultural Magazine*.

I feel very honoured to have been elected President of the Avicultural Society and unworthy to follow in the steps of such a great man.

JEAN DELACOUR

By Dr. TIM LOVEL
(Andover, Hampshire)

Jean Delacour was born in September 1890 in Paris, in his parents' apartment near the Opéra. He used to recall that even if one lived in the provinces, one went to Paris to be born and to die - the doctors in Paris were better for both. Every year the family went from June to October to the Château of Villers-Bretonneux, the family mansion near Amiens. Here his grandmother had a pheasantry, an orchid house and a Chinese pavilion where, at the age of two or three, Delacour remembered admiring the Carolina and Mandarin ducks.

At the age of four or five, he was already crazy about birds and he had an aviary in his Paris nursery where he kept canaries and finches. His father, amused by his younger son's passion for birds, gave him the pheasantry at Villers and said he could do what he liked with it. His brother had bantams, so Jean began at once to develop his interest in foreign birds. In this he was not alone: the small town of Villers had at least 50 bird keepers amongst its 3,500 citizens, who were so keen on their hobby that every month a dealer would come with many large cages and baskets of Australian and Indian softbills and they would buy up the entire supply every time.

After his father's death in 1905, his mother and his uncle as trustees gave him money to build up his collection - they said they would rather that he kept birds than an opera dancer! In those years before the First World War his collection, particularly of pheasants and cranes, was one of the largest in France. Eight years of military service came to distract him from the birds, but still he managed to get home from the frontline on a motor cycle to see how the gardener was caring for them.

In 1916-17 the Château was the headquarters of Marshal Foch, and Jean well remembered letting himself in by the garden gate to his pheasantry, only to find Foch and Weygand sitting discussing the campaign inside the largest aviary; apparently it was the only place in that headquarters where they could find peace for a private talk! To the Château came important visitors and Jean recalled that one night Lloyd-George and Clemenceau gave him dinner at his own table; "Next night I gave them dinner at the same table!". Sadly, in the spring of 1918 the great German offensive broke out all along the front; the Allies were forced to retreat and the Château and park of Villers ended up in a No Man's Land being shelled by both sides, so that by the end of the campaign there was nothing

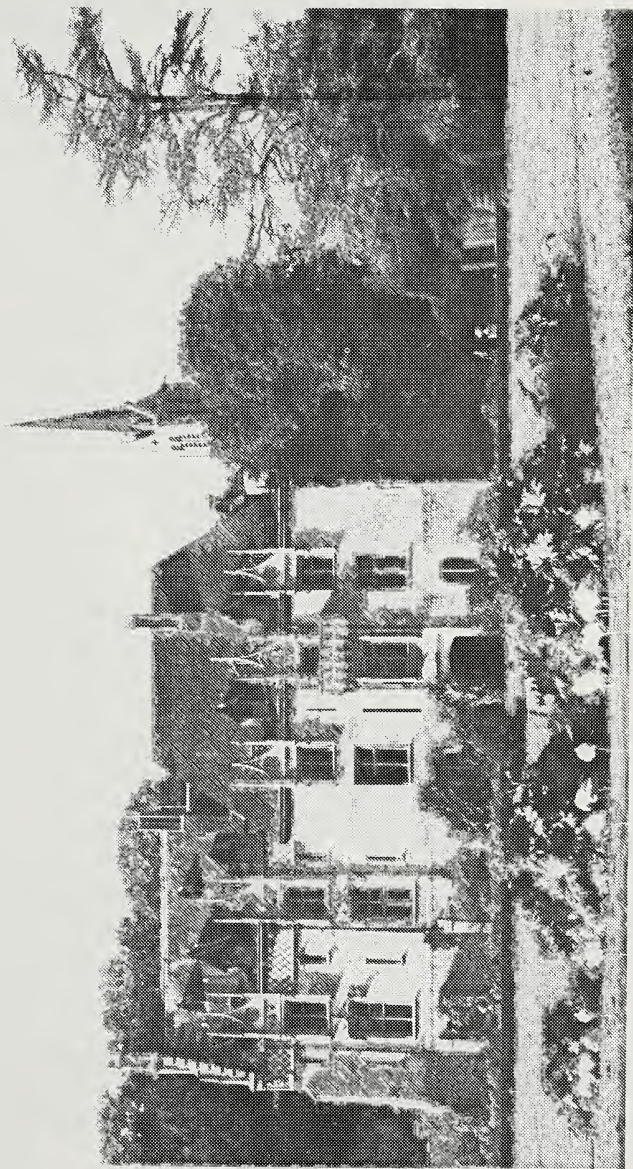
at all left.

The War ended and Jean determined to obtain a strictly scientific training. He went for this to Professor Bertrand at Lille who was famous for his accuracy and strictness. He would have no rich dilettantes about him and ever after Jean was grateful to him for the discipline that he imposed. There were no constraints to earn a living; 'In my day it was not supposed to be nice to get more money'. The change from this enviable situation was something always regretted by Jean. He felt that many a good young man had been lost to ornithology because of the need to earn a living.

It was also urgent to find a new home. He went to look at a place near Rouen which would have been ideal, but it was on top of a hill and completely dry. Jean wanted water, so when the Château and Park of Clères was offered to him, he bought it at once. It had all the ingredients that he required. In those days it was always the fashion in France to have an English gardener and an English birdman, and so Jean imported Frank Fooks, a man just two years younger than himself, who stayed in his employment for 47 years. Together they built up the collection at Clères to be world-famous. Not only the birds, but the mammals, trees and other plants all had to be the best, the most varied and the newest that could be obtained. Jean always separated his scientific interest in all species from his appreciation of their aesthetic qualities. When the Salvadori's Pheasant was imported again a few years ago, he dismissed it with 'Well, no doubt it is very good to have got it, but it is a most dull and boring bird!' No doubt he loved to shock his audience with these outrageous remarks. Nor were they confined to intimate gatherings. Many will remember listening to a lengthy exposition of a paper by an earnest lady when from the back of the hall came an unmistakeable voice, 'That woman is a fool' - pause - then, with exquisite timing, 'and not even a good looking fool'.

Birds, plants and mammals flowed in from all over the world. Together with Alfred Ezra and Spedan Lewis they sent collectors to get the best of everything. The birds were also being bred plentifully all over Northern Europe. Before 1914 he would recall that tragopans were reared in hundreds. Cabot's were cheapest and cost £6, Temmincks £10 and Satyr £20. The Western Tragopan would never breed in captivity although a few were obtained. He brought in the first Blue Eared Pheasants, about 30 in all, of which there were far more males than females, and distributed them among his friends. So far as we know no more have ever been imported from the wild since that time.

Together with Edward Hindle he went to a cold, wet, draughty expanse of marshland called Slimbridge to advise Peter Scott whether it was suitable for duck. They gave the enterprise their blessing and Jean was



The Chateau of Cleres

Dr. T. Lovel

always delighted to have been in at the birth of the Wildfowl Trust, and also of the International Council for Bird Preservation, which he helped to found just before the second war. He also strongly supported the hunters' organisation, C.I.C., finding nothing paradoxical in conserving rare species while shooting the common ones. 'It is nothing more than killing a chicken for dinner, if a species is plentiful', he said, 'It is unfortunate that man is made that way, but he has to eat'.

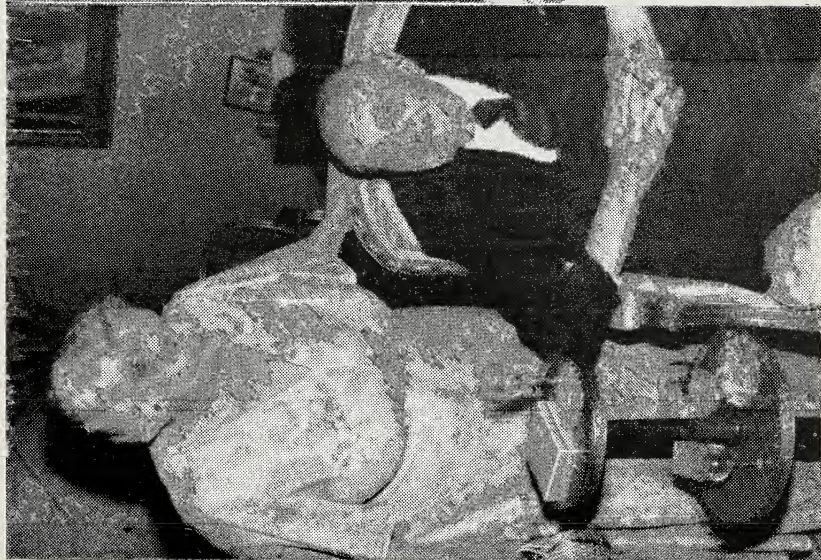
In 1923 he went off on the first of his seven expeditions to Indo-China, in which he made a comprehensive collection of the flora and fauna of the entire country. In those days it was a very stable, prosperous country - 'It was safer there in those days than France or England are now. Now it has all gone back to savagery'. Together with Jabouille, the Resident in Quang-tri, he collected pheasants and many other species from all over the country. Particularly important were the Crested Argus, the Edwards' and the Imperial Pheasants from Northern Viet-Nam. 'You never saw them in the wild although you could hear them calling quite close', he said, 'but you set traps and you could catch them immediately'. In obtaining these birds alive and in good condition, he went to very great trouble. 'Never put down corn in front of your snares', he would say, 'for the birds are then caught by the neck and killed. Set the traps unbaited and they are caught by the foot and will live, at least until the wild cats get them. Never let natives bring the pheasants in their baskets anywhere near the village chickens or disease will invariably result'. His birds had to live up to three months in cages and he found the high montane species particularly difficult. At least pheasants would always eat well after capture, whereas pigeons would totally refuse to eat and he would often have to cram a pigeon for a month before it would eat spontaneously. The voyage from Saigon to Marseilles took 25 days and the greatest care was needed to bring all his captives safely to Europe.

Diseases were not the only hazard: he used to describe how, as his boat came down the river into the harbour at Saigon, one of the cages fell open and the female Imperial Pheasant, the only one ever captured alive, flew out and skimmed low over the water into the docks. 'It went into a warehouse through the open doors and I had to wait in a fever of impatience until my boat docked and then I rushed along the quay and slammed the doors shut. The pheasant was roosting in the rafters and I had to pay a native boy to climb up and catch her'. That bird and her mate were the only ones ever brought to Europe and the whole captive stock descends from that pair.

Jean wrote prodigiously about the many species of animal and plant that he had studied. Apart from his monumental *Pheasants of the World* and the smaller volume on keeping pheasants in captivity, he also wrote



Dr. T. Lovel
 Celebrating Jean Delacour's 90th birthday at Chestnut Lodge, Cobham.
 (left) with Miss Ruth Ezra (President: (above) with Raymond Sawyer,
 (Vice-President).



with Dean Amadon the standard work on the Cracid family. His other great contribution about gamebirds was on the Pheasants of the Genus *Lophura* (*Ibis*, Volume 91, p. 188), where he brought order and understanding to that great sprawling group of ten species and dozens of subspecies and local variations. He loved to see variations from the normal; I remember him sitting for hours fascinated by the lavender mutation of Sonnerat's Jungle Fowl which occurred in Iain Grahame's collection at Daw's Hall, and his real delight when a pair of the pale mutation of the Grey Partridge was put in his hand.

Jean was a polymath, with an interest in everything and everybody; nothing escaped him and he could discourse on world politics, local scandal, the arts and finance as easily as he could upon zoological topics, and yet he was despondent for the future of the planet. 'There are too many people, and not enough food - there is no escape from that', he would say. But he had a solution: 'We need to decrease the number of humans, and to increase the available protein, and therefore I am in favour of cannibalism' - quick downward flap of the hands and that famous ironic laugh - 'So long as I am not involved personally'.

* * *

JEAN DELACOUR, MY FRIEND

By Dr HENRY QUINQUE

(France)

(Translated by Howard Swann)

'The real tomb of the dead is the heart of the living'

-Paul Valéry



Dr. H. Quinque

Jean Delacour and Dr. Henry Quinque, when visiting the author's home
in June 1980

My aim in writing these lines is far from an analytical study of Dr Jean Delacour's scientific work. On the contrary I would like to express my modest witness, as a close and faithful friend of the great man we have lost, to those who appreciated or loved him without having been able to know him intimately.

Since my youth I had a boundless admiration for him because I knew that he was an exceptional man. Then one day, alas now distant, he accepted my invitation through a mutual friend, to spend a day at my

home.

The moment I saw this tall man, elegantly bald with deep blue eyes, and heard him say but a few words, I realised that I had the good fortune to meet one of those rare personalities who are the pride of a century. The years that have passed have only confirmed my first impression.

A warm sympathy between us was born in these first few hours, and with the passing of time I could not help remembering the saying of the great 16th century French writer Michel de Montaigne, about his friend La Boëtie: 'If I was forced to say why I loved him, I would say that it is because he was he and I was I'. On that day I encountered a man whose example has greatly influenced me.

My profession has enabled me to meet great scholars and scientists, but Jean Delacour was something more than this: he was a man full of life, of contrasts and of spontaneity. A man close to us all but possessing an encyclopaedic mind and a curiosity like the men of the Renaissance.

His encyclopaedic mind

His interest in zoology is known to all but our readers will discover later more hidden aspects of his personality which are even more exciting.

Ornithology was certainly his main aim in life. His scientific work was always associated with his interest in the breeding of the most difficult species. It is rare now to open an ornithological work in which his name does not occur in the bibliography.

In 1948 Rene Ronsil, in his *Bibliography of French Ornithology* recorded 227 books and papers in his name. At the time of his death this figure exceeded 400 titles.

The birds he preferred were the waterfowl, pheasants, touracos, birds of paradise and hummingbirds. Before the First World War he had already reared many young touracos, and his mother used to write letters to him at the front to give him news of his favourite birds. At the outbreak of the Second World War he possessed the finest collection of waterfowl in the world, as well as aviaries with numerous birds of paradise and hummingbird tunnels.

Hummingbird tunnels were an invention of his own to enable these wonderful but unfortunately very aggressive birds to live together. Inside his aviaries he set up enclosures 10m long but no more than one metre high and one metre wide, filled with exotic plants. In these enclosures the birds lose their territorial instincts and 50 of them can live together without harm.

During his expeditions in Indo-China in preparation for the work which he wrote with Jabouille, *Les Oiseaux de l'Indochine Française*, he had one rather comical experience. In an expedition in Annam he was very keen to

see for the first time a living specimen of Rheinart's Crested Argus Pheasant *Rheinartia ocellata* which he only knew from museum specimens. He offered his Annamite collectors a considerable sum of money to bring him a live Argus. After ten days of waiting in vain, he doubled his offer. In the days that followed, first two, then five and finally ten live Argus Pheasants were brought in, which obliged him to strike camp without delay before the funds of his expedition were exhausted.

Much more recently he became interested in the birds of New Caledonia, a French territory in the South Pacific. He made two important journeys there to study them in 1962 and 1964. He was horrified to learn that the rarest birds of this endemic fauna, even those in danger of extinction, were being destroyed by shooting, by forest clearances and fires and by domestic animals gone wild.

He decided then to write an accurate but simple handbook designed especially for the local population. His aim was to save what could still be saved by making those capable of understanding aware of their responsibilities.

This little book cost him much work, but he was rewarded by its effect on the conscience of the most responsible people of New Caledonia, though they are unfortunately not the majority. Some of them did understand, however, that the birds they used to see and sometimes eat were disappearing, and that they existed only in this little territory of New Caledonia and its neighbouring islands - a minute part of the world. Unfortunately the destruction of these birds has not been stopped, but the extent of it has at least declined. An ornithological society has been founded in Noumea, as well as a zoological park which can help in the desperate attempt to preserve the Kagu *Rhynochetos jubatus*.

It would be desirable if the *Guide aux Oiseaux de la Nouvelle Calédonie* published in 1966, were to be reprinted. Unfortunately this would not be a commercial success, because the sales of this fine little book, well illustrated by L. Sandford, did not cover the cost of printing, in spite of a generous grant from an anonymous American. An English edition would probably be more successful, at least so the author thought.

When one observes how scrupulously Jean Delacour quoted in his introduction all the authors who had preceded him in the study of the fauna of New Caledonia, it is shocking to see how a recent book on the subject, which is nothing but a piracy of his work adorned with photographs, does not mention his name except briefly in the bibliography at the end of the work.

Well before the publication of this work, Jean Delacour was interested in the avifauna of New Caledonia, which is unique in its density and endemism on such a small territory. It comprises no less than 116 species of which 91 are sedentary in an area of 20,000 sq. km. Of these, 20 species are endemic,

including exceptional birds such as the Kagu, sole species of the family Rhy-nochetidae, the Horned Parrot of the genus *Eunymphicus*, *E. cornutus cornutus* being found on the mountains of the main island and *E.c. uvaeensis* very localised on the north atoll of the little island of Uvea.

To this list of rare wonders must be added the pigeons, represented by the giant Goliath Imperial Pigeon *Ducula goliath*, which is the largest pigeon in the world that is capable of flight, though perhaps not for much longer, the Metallic Pigeon *Columba vitiensis hypoenochroa* and finally that incomparable jewel, the Cloven-feathered Dove *Drepanoptila holosericea*.

For years Jean Delacour told me with enthusiasm about these marvellous and endangered birds which he had seen in the natural environment in which they had evolved. I shared his enthusiasm all the more readily because I had maintained ornithological contacts with New Caledonia for over 35 years.

Thanks to the generosity and trust of the Government of New Caledonia to which Jean Delacour had warmly recommended me, I was able to obtain some of the most interesting birds of this region. Jean Delacour's delight when I succeeded in breeding, one after the other, the Horned Parrot, the Cloven-feathered Dove and the Metallic Pigeon is a precious memory for me. He was all the more pleased because he saw here a means of saving these birds which were on their way to extinction. Moreover, they had never been bred in captivity before, even in their native land. However, both he and I were much more doubtful about the possibility of breeding the unpredictable Kagu in captivity in Europe.

A number of these birds had been imported during the past 80 years, and even the best equipped zoos, notably that of Berlin, had only experienced failures. Jean Delacour even told me that it was almost a pity to keep these extremely rare birds in captivity when it seemed impossible that they would breed. This opinion only confirmed my determination to analyse the reasons for my own lack of success. The day that my first Kagu hatched was one of the greatest ornithological pleasures of my great friend. It will naturally be in his honour that I shall shortly publish the results of my successes in this field.

.....

If ornithology was a main centre of interest for our friend, it was not the only one. He was also seriously interested in Mammalogy.

His first encounter with gibbons was entirely accidental. One of his French friends in Indo-China was accustomed to sending him live birds from time to time. Imagine Jean Delacour's surprise when he received, without warning, a pair of Black Gibbons. At that time he had a positive dislike of monkeys and immediately took steps to rid himself of these

unwelcome animals.

Their intelligence and behaviour, however, soon appealed to him, so much so that their descendants still live and breed at Clères. Dr. Delacour even became one of the leading experts on the systematics of the Hylobatidae. These primates are extremely difficult to identify because the same species vary in their fur from one region to another, from one sex to the other and even from one period of life to another in the same individual.

Early on a gibbon kept at liberty in the park at Clères attacked a young keeper and opened his abdomen from top to bottom with surgical precision. The wounded man was saved, but since then the gibbons have been kept securely on the island in the lake. It is there that Suzy was born, a charming female Black Gibbon *H. concolor*, who was attached to Jean Delacour by a deep mutual affection for more than 30 years. He kept her in complete liberty at the cost of some disagreements with his mother of whom Suzy was jealous. She had a habit of dropping on Madame Delacour's umbrella when she was on her way to Mass, and wiping her dirty hands on her summer dress, with reactions which can be imagined. But Suzy remained a favourite child and allowed her friend Jean to handle her own infant when she became a mother.

Apart from the gibbons, the collection at Clères boasted the first herd of Sitatungas in Europe, not to mention Indian Blackbuck, Muntjacs and numerous kangaroos, which were naturalised in Normandy for several generations.

It is well known that Clères in its prime was the finest private zoo in the world. The collection of wildfowl included all the known species and breeding successes were numerous. In order to achieve this Jean Delacour maintained an association with the best collectors of the period, such as Goodfellow and Frost, later also Charles Cordier, who is still with us and who was the first to bring back the Congo Peafowl alive.

Jean Delacour was not only a scientist in systematic ornithology, he was also an aviculturist of genius, able to make the most meticulous observations. He had also great practical ability, and was himself responsible for planning the aviaries at the Château de Villers-Bretonneux and subsequently at Clères.

Being at the same time a capable aviculturist and an exceedingly well-informed scientist, he was able to make observations which would have eluded most of us. On one occasion when we were walking beside my duckpond, we saw a fine brood of Ringed Teal, freshly hatched, which were swimming actively between their father and mother. He told me then that among ducks of the northern hemisphere the mother alone looks after the young, while among those of the southern hemisphere the male and

female together take care of their offspring. That day again I learned something new.

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Though his knowledge of zoology was so vast it was not Jean Delacour's only interest. He was equally a botanist of professional standard and a lover of plants as much as of animals. As a boy he spent the rewards he received for his brilliant scholastic achievements on purchasing orchids which he loved for the rest of his life. From each of his voyages he brought back rare or simply beautiful plants as souvenirs. Above all he loved cacti, and the terrace of his private apartment at the Château de Clères was planted with them all along the wall which sheltered them from the cold. He personally attended to his collection for many years and each autumn, before leaving for England and the United States, he had his fine plants protected by specially made glass frames.

He was also very fond of fuchsias which he kept in large bowls, and of his old bonzai, a juniper I believe, which I always saw facing the dining room, where it must have heard many interesting conversations during its long life.

.....

Ornithology, zoology in its widest sense, and botany known and practised to this extent would have filled the lives of several learned men, but they did not suffice for Jean Delacour. If what has been mentioned above is known to all, what follows is certainly known to few.

He was really like those great minds of the Renaissance, athirst for universal knowledge. He was a great connoisseur of painting, music and literature. He was familiar with all the schools of classical painting and their great artists. He owned some very fine primitive paintings and carefully preserved the originals for the illustrations of his books. He could draw well himself and a number of his illustrations were published, for example, in his well-known treatise on aviculture. It is certainly less well-known, owing to his reserve, that he was a fine classical singer of professional standard. He had studied music and singing very seriously and in his youth had considered making it a career, but zoology and social considerations dissuaded him. His voice was harmonious and his accent distinguished. His superb baritone voice, with its wide range, enchanted the salons of his family friends in Paris, and he was often accompanied by soloists of international reputation in his renderings of the songs of Mozart and Schubert. He made light of the technical difficulties of com-

posers as sensitive as Saint-Saens, Fauré and Gounod. When age affected the quality of his voice, he gave up singing completely but he never lost his love for classical music. On the other hand he had a feeling akin to hatred for the cacophony called modern music, which he called the music of savages.

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His interest in book collecting was such that at the outbreak of the Second World War he possessed all the works of John Gould and François Levaillant, among many other treasures.

Fire destroyed all this great collection, and with advancing age he gave up the acquisition of old books, of which the price was becoming prohibitive. In his study at Clères he kept, in an old cabinet from Indo-China, only the books he himself had written and no others except those which had been dedicated to him by their authors. He gave me all the few remaining copies of his work on the birds of New Caledonia.

His knowledge of literature was as boundless as his knowledge of science. We spent hours in discussion of literary classics and in appreciation of their pleasures.

I remember his interest in the philosophy of Confucius whose opinions, he maintained would be valid as long as there are civilised men. He liked especially two fine quotations. Here is the first: 'Experience is a lamp which one bears on one's back, and it only illuminates, alas, the path we have already trod'. Indeed, we reject in our youth the opinions of our elders, only to accept them eventually as the fruit of our own errors.

The second thought of the great Chinese philosopher expressed for him all the vanity of false knowledge. It is excellent. "One can talk with someone who knows, one can have a discussion with someone who does not know, but even Buddha could not manage to convince someone who believes he knows".

Moreover, I think Jean Delacour's choice of Clères in Normandy as his home is evidence of his refined taste. There he was perfectly happy, surrounded by the animals he loved, in a highly civilised environment. The château, well-known at least from photographs, was splendid before the fire which gutted the interior. The rooms, which have lately been adapted for the reception of the public and the keeping of birds, were originally a dining room and drawing rooms decorated with tapestries and fine fabrics. The furniture and the paintings were of the finest, and the library outstanding. When he returned from the United States after the Second World War, he found his château intact on the outside. But when, in the company of a friend, he entered it, he discovered that everything was reduced to ashes though still in its place and recognisable. The draught

made the curtains fall, the doors of the wardrobe in his bedroom collapsed and his clothes vanished into the dust when he touched them. The fine books still stood on the blackened shelves in the library, but at the touch of a finger they collapsed in ashes. Only Gould's *Monograph of the Trogons* still remained as a book in all this delusion. It was given to René Ronsil, the librarian of the Société Ornithologique de France, who restored it to the best of his ability, carefully mounting the surviving plates on fresh paper, and kept it as a cherished souvenir until his death.

One can imagine what an experience this was for Jean Delacour. But he did not give up. He had the main château restored to the condition in which we know it today and moved into outbuildings which are even more ancient and of great beauty.

We have ourselves spent memorable occasions in the drawing room and the dining room formed in the circular gallery overhanging the drawing room, beneath a marvellous coffered ceiling with huge beams painted with richly coloured floral designs.

In his advanced age the master of this dwelling lived mostly in his room on the ground floor, unfortunately rather damp, surrounded by furniture of the last century which he had brought back from Indo-China.

His view of society

The fortunate circumstances of his birth would have allowed Jean Delacour to pass his life in gilded idleness. His parents lived in the magnificent Château de Villers-Bretonneux, and his grandmother on a superb estate at Neuilly, to which she introduced dromedaries and elephants hired from the zoo for the amusement of Jean and his brothers. Yet he was a man who worked unceasingly all his life just for the pleasure of acquiring knowledge.

He who was so well acquainted with nature and with life believed that the egalitarianism preached by a certain political ideology is a snare and a delusion. No living being is identical with another though each has his place in human or in animal societies. He had the wisdom to respect every individual, but much more those who deserved respect for their efforts and the quality of their personality.

One summer evening we were exchanging our views, seated in comfort on the terrace outside his apartment. Before us were the two fine little pools which had been made for goldfish and water plants. "Look at these fish", he said, "they are more intelligent than most human beings. When first put here they multiplied very rapidly up to their present number. After that they ceased to multiply. It is a great pity that human beings do not have their good sense, but multiply faster than they can feed themselves, hastening to their inevitable destruction. Human societies,

*Dr. H. Quinque*

Jean Delacour talking with the author at Cleres, August 1982

with the exception of a nucleus of the international élite, are in complete decline. The decline of the Roman Empire extended over 250 years. If our moral laxity continues only a few more years will see the disappearance of the advanced civilisations in favour of the most brutish materialism. Do you remember Paul Valéry's words of warning: 'Decadence comes from a satiety with goodness and an appetite for the bizarre.' We have already passed the stage of the bizarre'. In spite of this clearly cynical language, I know that he still had confidence in the ability of responsible and far-sighted men to take up the torch of civilisation.

Jean Delacour shared his life and his heart between France, England and the United States. When he returned each spring from the Anglo-Saxon countries he praised their merits and even maintained a preference for them over France. I suspect that he had the opposite opinions in London or Los Angeles but kept them to himself in politeness to his hosts. He was a citizen of the world. It was a point of honour for him to write his English works directly in that language without any help or correction, and in doing so he never dictated to a secretary but wrote everything in his own hand.

On the subject of aviculture he used to say that no publication in the world was equal to the *Avicultural Magazine*. He had much appreciated Miss Phyllis Barclay-Smith CBE, Honorary Editor from 1939 to 1973, and had the highest regard for our present Honorary Editor, Mrs. Mary Harvey, for her complete devotion to our journal in a period of great difficulties.

He was most faithful in his friendships and his affections, though a great modesty prevented the expression of his feelings. The death of one of his two brothers at an early age wounded him for life. The death of his mother, who lived with him in Los Angeles, at the age of 95, affected him deeply and he often spoke of her. They are now both buried in California, far from their native land.

He enjoyed the company of hundreds of worthy friends and carefully avoided others. Among those whose names are familiar to me, I know that Alfred Ezra was a great friend, followed by his daughter Miss Ruth Ezra, who is now our President. He spoke of her with warm sympathy, as also of our friend Raymond Sawyer; the former Duke of Bedford; his friend Jabouille, who was Governor of French Indo-China at the time they wrote their work on the birds of that country together; Aimé Decoux, a fine man of letters and ornithologist, as well as Professor Berlioz and many other great names were counted among his friends. More recently, he enjoyed the devotion of the director of the park at Clères, Dr. Ciarpaglini and his wife, as well as of the Schreibers, the well-known ornithologists of the Los Angeles Museum.

His personality and character

A superior intelligence, an exceptional fund of knowledge, boundless culture and a gift for words made Jean Delacour a superb host. One could remain far into the night charmed by his conversation. When he spoke of South America, the Pacific, or Asia, it was as if one followed him through the forests or on the rivers in search of unknown birds. In spite of his great knowledge he never monopolised the conversation at the expense of others.

I believe that a large part of his heart had remained in French Indo-China. He often spoke of that ancient civilisation with its respect for symbolic values. He loved to tell of the pleasure of meeting a simple peasant working the paddy field with his buffalo who would greet you with a traditional courtesy that was exquisite and respectful. These people preserved the customs of their ancient civilisation; for example, a man did not allow his beard to grow until he was the grandfather of three male children. The memory of these details pleased Jean Delacour all the more when political materialism had swept them nearly all away.

He never returned to the French overseas territories after their independence, which he felt had had disastrous results, in most cases. He preferred to keep his memories unsullied and to avoid what he thought of as political lunacies.

He kept his memory in training all his life, as an athlete trains his muscles; and when the time came that his legs could no longer support his body properly, his intelligence and his memory were still as bright as ever. One summer Sunday a few years ago, I had invited two or three professional ornithologists to meet him at my home, one of whom, a mutual friend, was professor at the Paris Museum. In the morning while Jean Delacour was resting in his room we began to visit the aviaries. None of us was able to remember the Latin name of one bird in particular, though it was quite a well known species. It evaded all our efforts. When Jean Delacour joined us for the afternoon visit, he turned to me and said simply, 'You have a fine male *Chlorophanes spiza*. He was then 93 years old. He was a splendid guest, who always had an agreeable compliment for the lady of the house and a regard for the staff.

In fact, this great scholar remained at heart a simple man, which added greatly to his charm. He simply loved life; he appreciated good food and the beauty of a table well laid. His wide education did not prevent him from holding decided opinions and in certain matters he made known his likes and dislikes. Though he was never aggressive, he could react with vigour if he was attacked.

One professional ornithologist attached to a great museum of international reputation had gradually become his enemy and did not conceal the fact, either in private or in print. One day it became well known that this man's wife was leading a double life. Jean Delacour remarked, "X's wife is deceiving him, it's a proof of the existence of God". This saying hit the nail on the head.

As with human beings, so with animals. He had his preferences and though he loved almost all of them, he found some less attractive. For example, he found tortoises stupid, dwarf flamingos disfigured by their 'big noses' and the lovely bustards stupid and bad natured. On the other hand he loved enormously Suzy whom I have already mentioned, his old male Cereopsis Goose and my aged "Noiraud", a Palm Cockatoo who lived in complete liberty at my home for more than 30 years, and whom Jean Delacour had known since 1925 when he was imported by a mutual friend.

In the matter of food he had also fixed opinions. He had a weakness for crustacea, duck à la rouennaise, foie gras, great wines and old champagne, which alternated from time to time with the mineral water which he made himself drink every day. We both shared a love of chocolate. On the other hand he detested mackerel in white wine, pigeon and sweet-breads; al-

though with this last my wife caught him sometimes with culinary snares.

His company was appreciated throughout the world

Those of us who were honoured by his friendship and even his affection appreciate that his company was sought by the great of this world. The greatest scientists enjoyed meeting him. European statesmen received him personally to benefit from his advice in the creation of zoological parks.

He was a close friend of the old Duke of Bedford, with whom he dined often at Woburn Abbey. Japanese princes were his friends. One day the Emperor of Japan received him personally for a strange duck hunt. Together with some friends of the Emperor, Jean Delacour was provided with a large net to catch the ducks at the moment when they rose in flight from small, specially constructed waterways. After this, the guests enjoyed the fillets of duck roasted on a wood fire. This day remained alive in his memory, especially because he was later received in his private study by the Emperor, who showed him his vast collection of marine worms, a group of which he is one of the great experts.

In conclusion

Jean Delacour worked all his life for the animals he loved so well. Early in his life he wrote some glowing words about them with the impetuosity of youth, for example, in the account of his first voyage to the Caribbean.

He showed the same devotion to his human friends, with kindness, good humour and constancy. He was the best friend one could imagine.

In advanced years he declared to me: "What makes me despair is that I cannot interest myself in anything, I am too old". Yet right up to his death he remained appreciative of respect and sympathy.

At the beginning of 1983, Mr. G.L. Schulman, President of the I.F.C.B. organised a great international meeting in Los Angeles - The Jean Delacour Symposium. His efforts were worthy of gratitude for he gave our old friend one of his last happy public experiences. There were 50 speakers from 27 different countries. When it was my turn to speak, Jean Delacour, though tired, left his apartment and came in his wheelchair to help me, fearing my uncertain English would not be equal to the questions that were put at the conclusion of my speech. The final day of the congress ended with a banquet for 700 guests. Jean Delacour thanked the assembled company with a graceful speech of appreciation, his voice charged with emotion. He told me afterwards how happy he was.

The last letter I received from him was distressing. He knew that he was about to die and said so without complaint. "I can write no more to you", he wrote in a faltering hand, "My hand is getting paralysed and can no longer hold the pen".

Then he left our world in dignity, a burden to no one, vanquished by time and death which ends all good things. He has left us a magnificent example of courage in beginning his life again twice when most people would have given up.

He has left also an example of generosity in bequeathing all his possessions to the Natural History Museum in Paris, which has set up at Clères the Jean Delacour Foundation. Few men of his quality are produced in any century, and future centuries will see even fewer.

Above all he was a warm and faithful friend, whom one will always be proud to have known.

Farewell then, Sir. Our thanks for your time among us and the great example you have given us.

I would like to thank Mr. Howard Swann, Chairman of Wheldon and Wesley, for his sensitive translation of this article.

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REMINISCENCES OF JEAN DELACOUR

By PROFESSOR S. DILLON RIPLEY

(Secretary Emeritus - The National Museum of Natural History,
Smithsonian Institution, Washington D.C., USA)

Jean Delacour first came into my acquaintance in 1936, when I was still an undergraduate at Yale University. I frequented the American Museum of Natural History quite often during those days as, in spite of my designation as a potential lawyer (and majoring in history at the University), I took a good deal of time to stay in New York where my family lived and to drop back and forth to the Bird Department of the American Museum of Natural History. I was anxious to learn more about birds and to encourage my new friends in the bird field to help me out.

Someone mentioned that the great Mr. Delacour was going to be in Dr. Chapman's office for a few days en route from the Caribbean on his way to France and his office there at the Château de Clères, and so I met the great man. I do not recall whether we had corresponded beforehand, but as I was already quite keenly involved with keeping waterfowl in Litchfield, Connecticut, on our summer place, I believe that perhaps I had written to him in one way or another because of his noted collections of all sorts of birds and mammals on the grounds and park of the Château.

Mr. Delacour turned out to be very jolly and pleasant, with the highly refined manners of a French gentleman on first meeting a stranger - even though the stranger was friendly and eager to make his acquaintance. In those days one was aware that on first meeting such illustrious people there was an innate sense of reserve expressed in their manner and appearance, giving them a protective armour in case the new acquaintance turned out to be a boor, or pressing too much for some fancied advantage, or seeking out some gift, or discourse that would be tedious for the personage involved.

Gradually, as the conversation went on, Mr. Delacour relaxed and seemed to enjoy reminiscing about his trip through the Caribbean on the yacht with Lord Moyne and Lady Moya Beresford. I forget the other members of the house party on the large ocean-going yacht of Lord Moyne but they had stopped off to see friends (who later became significant parts of our lives, the Phelps, Senior and Junior, the bird luminaries of Venezuela) and I gathered that the trip, including visits to various islands in the Caribbean, had been pleasant and rewarding.

After graduation, I myself embarked on expeditions for nearly three years, until the late autumn of 1939 when I returned from my second long

expedition to Indonesia and the Southwest Pacific. During this time, I corresponded briefly with Delacour on subjects which I thought would interest him, such as birds of paradise in New Guinea, or unusual pheasants seen in zoos, or in the wild state in Sumatra, or among the bird dealers of Singapore, but it was not really until after the war that my wife and I were able to visit him at Clères.

The onset of hostilities provoked a violent change in Delacour's life. It was not long into the 1940s when he and his mother appeared in New York City, under very different conditions from our first meeting. In this case, he was anxiously seeking an apartment or somewhere where his much older mother could live and at the same time find an outlet for himself in the world of ornithology and aviculture. By fortunate coincidence, his long-time friendship with William Beebe, the famous explorer-naturalist, associated with the New York Zoological Society, led him to receive the offer of a position in that Society concerned with the Bronx Zoo. The position became Jean's first job! He had been asked by Fairfield Osborn, the President of the Zoological Society, to take over the design and advise on the aesthetics of new quarters for mammals and birds. Delacour, of course, was the foremost exponent in those days of the new art of zoo landscape. The breakaway from the stated cast iron bars of cages, the creation of diorama-like effects in open pens with concealed moats, the presentation of birds with plants intermixed to create a garden-like atmosphere, even though behind wire mesh, was all a new subject. First started in Germany under the Heinroths, and carried out by Delacour himself in the design of the new zoo at the Parc de Vincennes, created for the French Exposition on Indochina in 1937, made a vast impression on the world of zoological parks. Similar work was undergoing in Antwerp, in Switzerland and in a host of other zoos, many of them in the United States and some in Canada and Brazil, but the effort of remodelling older buildings and creating new park-like landscape facilities was still alien to the zoo profession. It would be a number of years, including the technological advantages of new materials after World War II, before zoos would begin to coalesce in the feelings of open air, landscape space, and the intrusion of plants, formerly confined to botanical gardens, into the milieu of the zoos.

Delacour could thus certainly claim the principal credit for the renovations undertaken at the Bronx Zoo during World War II. He was in the forefront, not only in designing and landscaping the facilities, but also helping to select the choices of birds and mammals as well as reptiles to be shown in such quarters most successfully, with a view to their maintenance as well as their aesthetic appeal. At the same time, Jean found himself immersed in systematic studies at the American Museum of Natural History, and until I went overseas in the early summer of 1943 (plunged into

war work which would last until the latter part of 1945) I saw a good deal of him on my visits to New York from graduate school at Harvard or from Washington.

Many visits to the Delacours' apartment and later to the Stanhope Hotel, where they settled, meant that our friendship flourished. We found ourselves at home on subjects as various as the habits of rhinoceroses in Southeast Asia to pheasants and waterfowl around the world. Delacour made a large and happy circle of friends in New York during this time and soon joined the Knickerbocker Club, as well as the Century, so that our interchanges became very frequent on a social level, as well as keen discussions interspersed on the subject of ornithology associated with the new systematics, as proposed by Julian Huxley, Theodosius Dobzhansky, and closely followed by the outstanding American ornithologist, Ernst Mayr, himself a relatively recent arrival from Germany.

Before going overseas I sought out Delacour's advice on possible people with whom I could be in touch on my travels abroad for the Office of Strategic Services. Sure enough, Lord Moyne had now become Prime Minister Churchill's personal representative in Egypt. Lord Linlithgow, the Viceroy of India, was a more distant friend, but certainly not unknown to Delacour. Then there was the Ezra family, originally from Calcutta, where Sir David Ezra still presided, but with close relatives in England in the person of 'Chips' Ezra, at Foxwarren Park in Surrey. An additional close friend of Delacour's whom I had not so far met was Phyllis Barclay-Smith, the honorary secretary of the International Council for Bird Preservation, and a revered figure in the world of aviculture.

The Avicultural Society, which he joined in 1916, loomed large in Delacour's mind and he continued to be deeply involved in promoting and cultivating exhibitions, friendships and interchanges through that Society with many foreign ornithologists. I had the good fortune, en route out to the Far East in my new job, to meet a group of the pillars of the Avicultural Society such as Phyllis, Miss Knobel, David Seth-Smith, Spedan Lewis and his curator (of the Leckford Estates) Terry Jones, during the few weeks that I passed in London. A visit to Foxwarren Park was a revelation to me in the manner and style in which mammals and birds could be kept in concert with people in an open collection. Mr. Ezra and his family were enchantingly friendly and nice to the young ornithologist (I was delighted when I learned that Miss Ruth Ezra had succeeded Jean Delacour as President of the Avicultural Society).

En route to India I stopped in Cairo and made the acquaintance of Lord Moyne, only a few weeks before he was cruelly assassinated. Further east, in India, I made the best of additional notes and letters to such persons as Sir David Ezra in Calcutta, and Dr. Satya Churn Law, the pre-

eminent aviculturist at that time in eastern India.

In subsequent years, Delacour and I became much closer, especially after I was married, appointed to the faculty at Yale, and found myself near enough to New York to be able to share visits with him and with Mary, my wife, at numerous conferences and meetings. International activities allowed me to become more active in the International Council for Bird Preservation, to which I was elected, becoming President in 1958 to succeed Delacour himself, and I continued that association right up until 1982 when I retired and, like Dr. Delacour, became an Emeritus President.

In the 1950s and 1960s we took several trips together in connection with conservation. Mary always accompanied us and became just as devoted to Jean as I was. We stayed often at Clères in those days, and will never forget the fascinating sensation of waking up in the guest room of the Château, over Jean's room, and listening to the early morning sounds of the awakening park inhabitants. There were the shrill, almost falsetto-like dawn chorus of the gibbons, the occasional barks and grunts of more terrestrial animals, the insistent complaining calls of the peafowl, as well as the grunting of brush turkeys and the honking of flamingoes, and ever so many calls of cranes, geese and ducks to reminisce about, reminding one of the far places of the world.

Delacour and I represented I.C.B.P. in a round-South America tour in 1955 with Mary, during which we visited national sections of the International Council for Bird Preservation in Venezuela, Brazil, Argentina, Chile, Peru, Ecuador and Colombia. In each country we made speeches and had meetings to help to re-invigorate, post War, the National Sections there. In a somewhat similar vein, we also visited South Africa for the first International Pan African Congress held in Bulawayo, Rhodesia (as it then was). It was a wonderful adventure for us, and in all of this, Delacour was quite unflappable, eager to participate and share his merry jokes and witticisms.

In 1960, Dr. Yoshimaro Yamashina, Chairman of the Japanese National Section, issued an invitation to I.C.B.P. for a meeting in Japan, at which we helped to inaugurate the Asian National Section, and spent an exciting few weeks travelling north to Hokkaido and south through Kyushu in search of rare birds.

Delacour never returned to Indochina after the war, nor indeed to India, where so many of his pre-war friends had continued to live, but he did give me letters to people such as the Maharajah of Bikaner, to whose State I journeyed in 1947 with friends, and took part in one of the sensational sandgrouse shoots, now relegated to history. He was always fascinated, and highly supportive of my research efforts with Dr. Sálím Ali on

The Birds of India (1968-74), and equally so in connection with the monograph that I managed to write on the family of the Rails (1977). A number of his observations are incorporated in these volumes, but our best recollections were the visits he made to Litchfield to see our waterfowl and to take part in family events there. Jean became godfather of our youngest daughter, Sylvia, and took enormous pleasure in family gatherings, of all kinds and conditions, being devoted to both our mothers. He stayed for long periods of time, either in Litchfield or New Haven, and later on in Washington when he continued to come and occasionally talk, or visit ornithological groups. All through the time of his appointment as Director of the Los Angeles County Museum, we continued to visit and take part in his ritual migrations, to France in the spring, returning to New York sometimes, to stay at the Knickerbocker Club in the autumn, and after his retirement from the museum in Los Angeles, to spend part of the winter in the California Club in that city itself. His stays in New York, at the Knickerbocker Club, followed the demise of his two closest friends and hostesses in that city. These were Mrs. Milton Erlanger, 'Kick' as she was nicknamed, a vibrant, entertaining and highly dedicated conservationist, and Mrs Carll Tucker, equally devoted to birds and bird conservation and to the enterprise that we were carrying on in bird conservation through I.C.B.P. The death of these two ladies was a crucial landmark in Jean's life, as it was in so many of their friends and families, for indeed they marked the passing of an age of important philanthropy and patronage in the field of conservation.

One of the most entertaining episodes that I remember about Jean's frequent stays in Litchfield came during the winter. In order to travel around the duck ponds, I commandeered our farm jeep, and placing Jean beside me in the front seat, proceeded to enter the gates and drive around the edges of the ponds, looking for birds to identify. The ice seemed very strong on one of the smaller ponds, and wanting to cross over to get on the other side of a narrow canal, I suggested that we drive out onto the frozen surface. We did so but alas, halfway along, the ice gave way and so the jeep settled gradually on the bottom of the pond in the mud. Fortunately the pond was fairly shallow, and so the water did not come into the body of the jeep, but it left us in a pretty pickle. How could I persuade Jean to wade ashore? Never doubting the possibility of a rescue, I shouted for Allan Humphrey, then our faithful gamekeeper, who called up the American Automobile Association for a tow truck rescue. The tow truck finally appeared and from the edge of a nearby road, sending out a long cable, managed without any loss of dignity to pull us backwards out of the pond and on to *terra firma*. Subsequently, the motor started up and we managed,

with appropriate chuckles and laughs and anecdotes, making the occasion a festive one, as was his wont.

Similarly, not one of us who saw it will ever forget his 'mating' dance of the Japanese crane, performed in a kimono in a small inn beside a lake in northern Hokkaido one evening at a Japanese dinner. Jean looked the part perfectly. Spreading out his long arms and waving the kimono sleeves, in an effective manner, he circled around the room in a stately fashion, bowing from time to time and imitating the gait of the formal male display. All of this was accompanied with shrieks of laughter and delight from the assembled group of bird lovers.

Towards the end Jean became crippled and found it difficult to walk as his knees gradually gave way almost completely. He was gallant and never referred to his physical difficulties, always joking, and always inspiring others to joke with him. We were fortunate enough to have lunch with him in Los Angeles a week before he died, and the occasion was memorable for his jokes and anecdotes which continued as before. His like will not be seen again, I feel sure, for he was in every way I can think of a unique phenomenon.

* * *

WRITING "CURASSOWS" WITH JEAN DELACOUR

By DEAN AMADON

(Curator Emeritus, American Museum of Natural History, New York)

Curassows and Related Birds by Jean Delacour and the writer was published by the American Museum in 1973; 3,400 copies were printed; it is now out of print. The genesis of this book was peculiar. The late James Oliver, then Director of the Museum, told me that 'Ben' (John H.) Phipps, a patron of the New York Zoological Society, had offered to sponsor a monograph on the pigeons and doves of the world to be written by his old friend, Jean Delacour; would I help? Jean and I agreed that there are a great many species of pigeons; further Mr. Derek Goodwin of the British Museum (Natural History) had written an excellent, if sparingly illustrated, treatise about them. Why not tackle a smaller family? I suggested the curassows and guans (family Cracidae), a relatively little-known tropical American group of only 40-odd species. This proved agreeable to all parties.

Jean Delacour began to gather his notes on these birds, especially in captivity (I remember seeing a fine pair of Bare-faced Curassows during a visit to Clères). He had seen the Yellow-knobbed Curassow in Venezuela and heard its curious whistled 'song', so unlike the low-pitched rumblings of other curassows. I had heard the deafening choruses of chachalacas in Mexico, but now made trips to Venezuela to study curassows and guans. Both ventures were led by the late Paul Schwartz, who knew the country and birds well and to whom we eventually dedicated the book. On the first of these ventures we were assisted by Mr. G. Stuart Keith of the American Museum, who at that time had seen more species of birds in life, about 5,000 of the 9,000 that exist, than anyone else. On the second trip, Mr. Al Gilbert, who had been selected as the official artist for the volume, came along; Gilbert also went to Central America and saw in life the remarkable and rare Horned Guan. In Venezuela we were helped in many ways by Mr. William H. Phelps, Jr., who, with his wife and father, has done so much to advance ornithology in that country. I was able to study the Black and Crestless Curassows, and the Marail, Spix's and Piping Guans, as well as the local chachalacas. The Nocturnal Curassow we heard at night but never saw. I have described these field experiences in Chapter XI of the book.

Mr. Gilbert did most of the paintings for the book and also, with Ms. Mondy Dana, designed it. We were fortunate to secure four fine water-colour portraits of cracids from our friend the late George Miksch Sutton.



The White-winged Guan, painted for *Curassows and Related Birds*,
by the late David Reid Henry (D.M. Henry)

The supposedly extinct White-winged Guan posed a problem; there was no specimen in any American museum; indeed there were only two in existence. Mr. David Reid-Henry came to our rescue and painted the one in the British Museum. In payment he received a pair of Red Jungle-fowl from Delacour's flock at Clères. I hope they did not become victims of the Crowned Eagle which, I was told, David had tethered to a chair in the kitchen of his flat. A few years later the White-winged Guan was rediscovered in the wild but it is rare and endangered.

At that time several individuals in Phoenix, Arizona, were interested in curassows and breeding them in aviaries. There Gilbert and I, with letters of introduction from Jean Delacour, went to see their birds and to learn more of their experiences. Messrs. Mickey Ollson and Bernard Roer assisted us in every way when we visited their private collections. We also sought out Mr. Jack Throp, director of the Phoenix Zoo, who had recently written an excellent paper on the world's curassows. Throp is now with the famous collection of birds of paradise and other species at the Taronga Park aviaries in Sydney, Australia.

Curassows and Related Birds, as I have said, appeared in 1973 and I believe that Jean Delacour and our sponsor Ben Phipps were pleased with it. Neither of the authors accepted any royalties and this permitted a fine production by modern standards.

* * *

Whilst admiring a sunset at the Archbold Biological Station in Florida (Dick Archbold as a young man had accompanied the major expedition to Madagascar led by Delacour) it occurred to me that a medal honouring Jean Delacour might be appropriate. Upon returning to New York I presented this idea to Jean's good friend 'Kick' (Mrs. Milton) Erlanger and suggested that such a medal be sponsored by the Avicultural Society. She was enthusiastic but as she was at that time treasurer of the American branch of the International Council for Bird Protection, which Delacour had co-founded and guided as president; the decision was to give that organisation the honour of sponsoring the medal. After considering various birds, including curassows, the decision was to use the figure of an Imperial Pheasant, a species discovered by Jean Delacour, on one side of the medal and a likeness of Jean on the other, bordered by the inscription 'Aviculturist, Ornithologist, Conservationist'. A year or two later I had the pleasure of presenting the medal for the first time to Jean's old friend, Nobelist Konrad Lorenz.

I am but one of many individuals who cherish fond memories of that gifted and unique individual, Jean Delacour.

CAPTAIN DELACOUR AT THE BRONX (1941-1947)

By Josef H. Lindholm III
(Berkeley, California, USA)

(Quotations from Jean Delacour's writings are printed in italics)

July, 1940:

'During the last week in May, Clères was heavily bombed by German aircraftCaptain Jean Delacour wrote from Clères on 2nd June that this damage was annoying but not too serious and that it was his intention the collection should be maintained if 'nothing worse happened'. Since that date far worse events happened and the Editor last heard from Captain Delacour on 10th June from farther south, where he had been retreated with French troops, that Clères had been entirely lost. In all his letters Monsieur Delacour stressed the importance of continuing Avicultural publications and his intention to do his utmost to achieve this end

October, 1940:

'The Bird Department of the New York Zoological Park added forty-five new species to its collection during 1939, representing the greatest annual total of new species in the history of the Park

November, 1940:

'News has been received that Captain Jean Delacour and his mother, Madame T. Delacour, are alive and well; also there is some hope that Clères may not have been entirely destroyed.'

January-February, 1941:

'Friends of Captain Jean Delacour will be glad to know that he reached Lisbon in December last en route for the United States of America. Monsieur Delacour's address in America will be c/o Museum of Comparative Zoology, Cambridge, Massachusetts.'

Phyllis Barclay-Smith
Editor, *Avicultural Magazine*

May-June, 1941:

'Clères, as a bird park, is no moreWhen last I saw it, on 7th June, some thirty bombs, dropped a fortnight before, already had marred its appearance in many places and several hundred birds and mammals had been killed. I was then ordered away with my army unit and I have not seen Clères sinceI was demobilised on 20th July. My small part in

the defence of France was finished. In August my friends, Dr. A. Urbain, Director of the Paris Zoo, and M.F. Edmund-Blanc, visited Clères on my behalf. They reported that possibly a thousand birds, or less than a third of the original collection, remainedI consented to have the rarest removed to ParisSoon it was made impossible to feed the remaining birds and it became necessary for them to be disposed of to the firm of Louis Ruhe, of Hanover

'After spending four months following my demobilization in an idleness which was painfulI was lucky enough to be allowed to go to New York, where the hearty welcome of my American friends gave me a new taste for life. I was soon offered the position of Consultant to the New York Zoological Society. Needless to say I accepted and the great interest I am taking in the work, as well as in some other of a scientific nature at the American Museum, no doubt will gradually lessen my bitterness over everything I have lost in Europe.

'The future is in the lap of the gods. It seems impossible to make any plans at the moment but it would appear that conditions in France never again will be such as to enable me to resume my usual occupations there or to restore Clères to its former state.'

In 1941 Captain Delacour arrived at the sudden end of a time of dignified relative stasis at the Bronx Zoo. No major enclosures had been built since 1912, when the Zebra House and Bird of Prey aviaries completed the master plan of William T. Hornaday, the Zoo's first director (1896-1926). Although the 1900 'Flying Cage' was entirely rebuilt on its original frame in 1930, the single new exhibit built during the administration of director W. Reid Blair (1926-1940) was 'Snake Island', outside the Reptile House in 1932 (Bridges, 1974).

It was in 1941, after the brief, 'high-handed and arbitrary administration' (Bridges, 1974) of a former Superintendent of the New York Park Department, that the office of Director was discontinued (not to be re-instituted until 1952), replaced by a Planning Committee chaired by Fairfield Osborn, President of the Zoological Society, with the Ichthyologist John Tee-Van as Executive Secretary, and Lee S. Crandall, General Curator.

Dr. Hornaday, violently opposed to moated enclosures, had died in 1937. Nineteen forty-one saw the opening of the revolutionary 'African Plains', the barless panda exhibit (now for Pudu), the three-acre Moose enclosure (currently housing Roosevelt Wapiti), the Children's Zoo, and the removal of bars from the Elephant House yards (Anon. 1949). The New York Aquarium, closed for subway construction, was relocated from

Battery Park to the Zoo's Lion House, where it was to remain until 1957.

It was under these circumstances that Jean Delacour was appointed Technical Consultant to the New York Zoological Society. His employment* was no doubt at least partly in consideration of his major influence in the redesign of the Rome Zoo (1932-1934) and the construction of the Parc Zoologique de Paris (Vincennes), 1931-34, not to mention his election, in 1935, to the Council of the Zoological Society of London, becoming its first foreign member.

July-August 1942

'I have spent an early June week-end in the country, with my friends Mr. and Mrs. Milton Erlanger, and for the first time in many months I have had the time and everlasting pleasure, to watch aviary birds. This may sound strange, as my present position of technical adviser to the New York Zoological Park gives me the control of the mammals, birds and reptiles, and our collection of birds is now the best existing, numbering 1,800 specimens of 700 species, about half of which are perching birds. But my duties are many and absorbing, with planning, committee meetings, and office work, and I have little time to do more than quickly examine the birds in our Zoo. Mr. Lee Crandall, the Curator, and Head Keeper George Scott, themselves overworked, are both excellent aviculturists, and I rely upon them to take care of our birds.'

March-April 1943

'For more than ten years it has always been a thrilling experience to see Mr. C. Cordier arrive with a collection of birds. It happens once or twice a year. Until 1939 he used to bring his collections to Clères, and the surplus material found its way mostly to the London Zoo, to Mr. A. Ezra and Mr. Spedan Lewis in England, and to Dr. E. Beraint and M. François Edmond-Blanc in France. These happy days are over, alas! But Mr. Cordier still brings his collections, now to the United States. He brought to us, to the New York Zoological Park, a marvellous Colombian collection in December, 1941, and early in October 1942, he was back again, this time from Costa Rica, with perhaps the finest lot of birds he has ever secured.'

Captain Delacour had scarcely arrived at the Bronx Zoo when Charles Cordier contacted him from Venezuela, having been stranded, since the

**'.....the first time in my fifty years that I had been paid for my work, except when I was on military service. It felt rather strange, but it was satisfactory to realize that I could live on what I earned if the necessity arose.'* (Delacour, 1966).

outbreak of war, in South America (Barclay-Smith, 1942).

With Cecil Webb, Wilfred Frost and Ferdinand Shaw-Mayer, Cordier was one of a fabulous quartet of collectors, almost constantly in the field throughout the 1930s, collecting largely for Delacour. Cordier's last shipment, a magnificent collection of softbills, arrived at Clères in May 1939, from Tonkin, where he had gone almost directly after delivering to Clères Ocellated Turkeys and other Guatemalan birds (Delacour, 1939). He had proceeded to South America in anticipation of further collecting when war was declared, and contact with Europe was severed. Delacour had no idea of his whereabouts.

Upon receipt of his letter from Venezuela in 1941, Cordier was at once commissioned to make a collection of birds from the western side of the Colombian Andes, where practically no collecting had been done previously. Establishing his base-camp at Ricaurte, Colombia, he assembled a monumental collection, arriving in New York on 9th December, 1941 (two days after Pearl Harbour) with 81 birds of 24 species, at least eight of them new to aviculture (Table 1).

The centre of attention was the group of Scarlet Cocks of the Rock *Rupicola peruviana sanguinolenta*, the first specimens of *R. peruviana* ever exported.

January-February 1948

'The scarlet subspeciesis the only one to have been imported alive so farIt is the finest of all and the only true scarlet one. It was first brought alive to New York in December 1941 by C. Cordier, who landed twelve specimens in perfect condition, three of which remained at the Bronx Zoo, the others going to other zoos, and a pair to Mrs. Milton Erlanger ()They proved much more peaceful and sociable than the Amazonian species. At the time of writing, two of the original males are still living at the Bronx ZooSince Mr. Cordier's visit in 1941 the inhabitants of South-Western Colombia, who had learnt from him how to catch and to feed Scarlet Cocks-of-the-Rock, have regularly sent a few every year to the Louis Ruhe firm, in New York. The same thing happened with Quetzals in Costa Rica, so that these two marvellous species are well represented in American collections.'*

Early in March 1942, Cordier was on his way to Costa Rica, return-

*In 1949 Captain Delacour, visiting Mrs. Erlanger's aviaries in Elberon, New Jersey, found this pair 'finger-tamed and quarrelling to a minimum..... They have already played at nesting, and hopes are high for a brood some time!' (Delacour, 1950).

ing to New York on 9th October 1942 with 25 species, 17 never before exhibited (Table 2).

March-April 1943

'There are ninety-six birds in the collection, including three Umbrella Birds which have never before been exhibited alive. Fifty-four Humming Birds of which the majority have never been imported anywhere, and eighteen Quetzals, often called "the most beautiful birds in the New World.'

'.....The Umbrella Bird was probably the last great rarity among tropical American birds, that have ever been exhibited. Until 1937 it shared that distinction with the legendary Quetzalbut in that year the Bronx Zoo obtained nine of them. The eighteen Quetzals now brought by Mr. Cordier are a Costa Rican form of the bird, and only one specimen of this form has ever come to the United States.

'.....From the observations of Mr. Cordier, the Umbrella Bird spreads its "umbrella" several times a day, when it is feeling particularly good. If it actually sheds rain like an umbrella, the bird is more fortunate than others in central Costa Rica, for it rains eleven months out of the year in the Umbrella Bird country.

'.....The fifty-four Humming Birds in the collection comprise eleven species, at least seven of which have never been exhibited in any bird collection before.

'Although larger shipments of Humming Birds, in point of numbers, have been made by Mr. Cordier to Clères, in its variety and beauty the present lot is the best that has ever been made from the highlands of the American tropics.

'.....All the birds, a list of which follows (see Table II), arrived in extraordinarily good condition, and more than a fortnight after their arrival none had died.

'We had to dispose of some of the Quetzals, keeping ten for our collection. For the first time, I saw perfect specimens of these magnificent birds, tame and feeding well. Six inhabit a large planted aviary, and although there are several adult males, they never quarrel; neither do they molest the small birds, mostly Sugarbirds and Tanagers, which share their flight. The Umbrella Birds are also extremely tame and harmless.'

Charles Cordier was to make two further collections during Captain Delacour's time at the Bronx Zoo. In 1944 he sent 33 hummingbirds (Anna's, Black-chinned, Costa's, Calliope and Broad-tailed) from California (Anon, 1944a and 1949), where he had been engaged in 'war work' since 1943. On 15th March, 1947, Cordier arrived from Guatemala with a

magnificent collection featuring three species of Trogons (Table III) (Cordier, 1947a).

After Captain Delacour's return to Clères, Cordier undertook many subsequent collections for the New York Zoological Park: a second Costa Rican collection in late August 1947 (Cordier, 1947b), the monumental 1947-49 Congo Expedition (resulting in the first ever export of Congo Peafowl) (Cordier, 1949), the incredible Ecuadorian collection of 1950, with its two species of Umbrella Birds, the first eleven Equatorial Cocks-of-the-Rock exported and a Swordbill Hummingbird (Crandall, 1949), then from base camps established in the Congo and later Bolivia, a number of shipments of birds and mammals through the 1950s, 60s and 70s, sending a final shipment from Bolivia in 1983, just before his retirement to Switzerland, which included Pale-legged Oven Birds *Furnarius leucopus* that hatched two chicks in September, 1985. Cordier has also collected for many other zoos in Europe and the U.S.A. over the last three decades.

Thus, while Wilfred Frost spent the Second World War in an internment camp in Singapore, and Cecil Webb lived off the land, dodging the collaborationist government of Madagascar (and collecting intelligence), Charles Cordier, through his connections with Jean Delacour, began an association that resulted in some of the most magnificent animal collections ever assembled.

The arrival of Cordier's shipments coincided with a renovation, designed by Captain Delacour, of the 1905 Bird House.

March-April 1943

'We are now completing the transformation of one of our halls, where Pigeons and Parrots used to be kept in rather old-fashioned and ugly cages. We are making five long planted flights of different styles, more or less in the same way as the greenhouse aviaries at Clères were planned. One has a fast-running stream and is called the 'Tropical American mountain stream'. It contains some Blue-headed and Ruddy Buntings, a small South American Barbet, a dozen Manakins and Sugar Birds, a few small Tanagers, and a pair of Fire-throated Humming Birds (Panterpe). The next one is an 'Indian-Malayan Jungle'; there live some small Fruit Pigeons, Green wings, and Bleeding Heart Doves, a Pitta, a Rothschild's Starling, a Shama, a small Javan Barbet, some Bulbuls and Babuls, a few Timor Paddas and Crested Buntings.

'The other three, which will soon be completed, will be a 'desert', an 'American Garden' and a 'Tropical American Rain forest'. It is great fun designing and planting these aviaries. I find it the best substitute to the pleasure I so long used to have at Clères on a larger scale.'

May-June 1945

'When the astonishing circumstances under which we have all been living during the past few years brought me to New York, I found a good chance for experiment. I talked things over with my old bird friends Fairfield Osborn, President of the Zoological Society, and Lee Crandall, Curator of the Zoo, and in 1942 the old Parrot Hall of the Bird House was converted into a planted aviary. The old cages were removed, and in their place were built five flights, two on one side and three on the other, each 18 to 20 feet long, 6 feet wide, and 8 feet high, and standing two and a half feet above the floor. The hall is very high, and a giant bamboo, two large Kentia palms, and a few other trees give it a tropical garden atmosphere.

'Three of the flights are dedicated to tropical birds: Indo-Malaysian and tropical American. Another one imitates an arid plain, while the middle cage represents a little formal garden which we call the 'New England Garden'.....

'The "Arid Plain", or desert cage is inhabited by birds adapted to life in dry countries. It contains some Asiatic Pratincoles, African Sandgrouse, Egyptian Plovers, Diamond and Plumed Ground Doves, many species of Australian Grass Finches and African Waxbills, different Larks, some Galapagos Finches, and two Costa's Humming Birds from the Californian desert.

'Succulent plants such as aloes, cacti and yuccas have to be replaced about three times a year, as the glass roof of the house is too high above them and does not afford them sufficient light. But, at that price, the show remains excellent. Needless to say, the birds do exceedingly well and a number have nested successfully.

'The "New England Garden" is a little more difficult to keep in good condition, as hardy plants do not last very long indoors. They have to be replaced four times a year. We show in this cage a selection of our local small birds: Ruby-throated Humming Birds, Bluebirds, Hermit, Russet-backed, Veery and Wood Thrushes, Catbirds, Baltimore and Orchard Orioles, Cedar Waxwings, Purple Finches, different "Warblers", Sparrows, Nuthatches, small Rails, etc.

'To make and maintain such planted aviaries in suitable condition, it is essential never to place in them birds which would destroy the plants, and also to keep them perfectly tidy. An especially trained gardener waters and tends them every morning with great care and a bird-keeper cleans them thoroughly.

'This hall has been a great success with the public, and once again the proof has been made that what is really attractive and well done is appreciated by the ordinary visitors just as much as by specialized amateurs.'



New York Zoological Society Photo
Captain Delacour and Lee S. Crandall, General Curator of the New York
Zoological Park, 1943

The Galapagos Finches consisted of one *Geospiza magnirostris*, one *G. scandens* and six *G. fuliginosa*, all wild-caught by David Lack. They had been sent from the California Academy of Sciences in February 1942 to make room for experiments with captive-bred stock in San Francisco. In June 1942, one *G. fuliginosa* hatched in the 'Arid Plain' (Kinsey, 1942).

In the spring of 1945, the first captive nesting of hummingbirds took place in the 'New England Garden'. A female Green Violetear *Colibri thalassinus cyanotus*, from Cordier's 1942 Costa Rican collection, housed there for want of space began stealing parts of a Zebra Finch nest from the adjoining 'Desert'. After a nest was largely completed, the male was introduced and began to sing regularly when the female died suddenly of egg-binding (Anon, 1945a and b).

For the great majority of Cordier's series of hummingbirds, special accommodations were designed by Jean Delacour.

March-April 1943:

'In the new home of the Humming Birds that is being rushed in the Bronx Zoo's Bird House, they will be exhibited behind glass in small brightly lighted cages, while the public will view them from a black passageway.'

This exhibit, consisting of ten planted, glass-fronted displays housed in a small building constructed within the 'Glass Court' of the 1905 Bird House, was called the "Jewel Room". Opened to the public on 6th November 1942, after a preview for the consuls of nine Latin American Countries, it was replaced in 1945 by a much larger "Jewel Room".

July-August 1946

'The problem of exhibiting cage birds in public zoos is a difficult one. Until recently it has been tackled rather crudely. Too often just rows of wire cages are lined up on shelves. In the better cases fixed compartments have been neatly built. But practically never before has it been attempted to show the birds under the best possible conditions of light, which enables one to detect all the usually elusive metallic colours and delicate hues; nor, at the same time, to set them in an artistic frame. For many years I had planned to build a special hall, the walls of which would have had glass openings, giving view to birds and fishes. Cages and aquariums would have been decorated and planted. The effect would have been that of so many animated, living pictures. They would be set up in a wide corridor encircling the hall, where all facilities would be provided for cleaning and for the care of the creatures.'

"The centuries-old rooms of Clères, with all their historic interest, did not allow for such a scheme. But I had hoped to build a special house some day in a secluded corner of the park. Fate has decided otherwise ... However, I had a chance to achieve at the New York Zoo for the public what I once had dreamed to do at home for my own satisfaction. The result has been what we call the "Jewel Room".

"The Bird House in New York consists of three halls, the largest of which has not been much altered these last years. We have only redecorated the big central flight and some of the compartments. The second room has been completely changed in 1942. The numerous cages and small compartments for Parrots and Doves have been removed, and five roomy flights have replaced them. They are decorated and planted so that they now form the "New England Garden", for native species; "Arid Plain" for desert birds; "Indo-Malayan Jungle", for Asiatic species; "Tropical American Jungle Stream" and "Tropical American Rain Forest".

"The third hall was particularly unattractive in its former state: a large room, 60 ft by 30 ft, with an ugly glass roof and plainly built compartments all around, each containing a number of small or medium-sized birds. They were badly lit, and none of the beautiful colours or metallic reflections of the inmates could be seen at real advantage. It was the more unfortunate that it always housed a wonderful collection. This hall has been entirely renovated during the winter of 1945, and it was reopened as the "Jewel Room" a little more than a year ago.

"The transformation has been comparatively simple and easy - a smaller room has been built inside the hall, entirely dark but for the light which comes through the glass front of the cages that open in the walls; it all looks like a gallery of live bird pictures, as in my original plan. Also it reminds one of modern techniques used in aquarium and terrarium. The hall has two large double doors, one at the end of the western wall, the other one occupying most of the smaller southern panel. As a result the cages form two groups, one occupying the greatest part of the western wall, the other L-shaped, all along the northern and eastern sides. Those of the first group, ten in number and of three different sizes, are dedicated to Humming Birds. The others consist of one large (10 ft by 11 ft) unplanted but nicely decorated aviary mostly for hardbills, of two fair-sized planted compartments (5½ ft by 5 ft) and seven smaller ones (3½ ft by 3 ft). They are at present occupied by a Fairy Bluebird, a Rothschild's Starling, a Cock-of-the-Rock, and a number of Manakins, Sugar-birds, and small Tanagers, which are doing exceptionally well in such quarters. They will be ideal for Sunbirds, the smaller Birds of Paradise, such as Kings, Superbs, and Wilson's, when they are again available. The large hardbills' aviary and the two adjoining smaller cages are painted a gay light yellow inside. All



New York Zoological Society Photo
The Rothschild's Mynah exhibit in the 'Jewel Room', June 1945

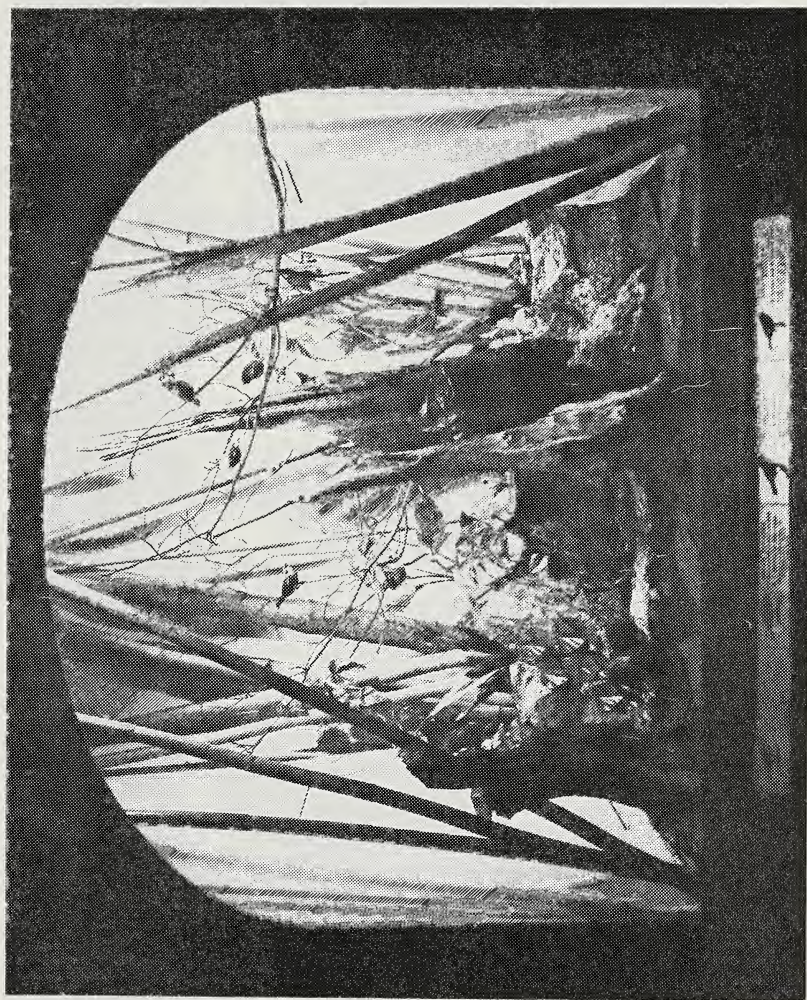
the others are pale greyish blue. I am against backgrounds with painted landscapes or other scenes, as they are too difficult to keep clean. The cages are strongly and appropriately lit by natural light from the glass roof, and also from heatless electric tubes disposed at a favourable angle inside the cages, at the top of the corner in front, quite invisible to the public. The metallic reflections of the plumage are thus seen at their best. Troughs are inserted through the bottom, along the back of the floor, and filled with tropical plants and flowers. It looks like Gould's plates, but it is alive.

'The public room, on the other hand, is absolutely plain, painted a dark neutral grey, so that the visitor's attention is not distracted from the exhibits. We found that in order to give the proper illusion of adequate space, cages must be very deep (deeper than wide) and that the back must always be rounded, angles looking very ugly. Proper ventilation is essential; and to ensure this holes have to be pierced at the lower part of the cage, while the top is partly covered with small mesh wire netting, as used against flies and mosquitoes.

'Rather complicated devices had to be conceived for the proper working of the cages. Mr. Lee Crandall, the General Curator and one of the most experienced aviculturists I have known, has invented most of them, with the help of the Head Keeper, G. Scott. For the cleaning of the Humming Birds' compartments, we place on the top a bottomless movable cage. A large trap in the top of the compartment slides outwards so that the Hummer can easily fly up into the movable cage and be confined there while the compartment is cleaned through the whole back side of the compartment, which can be opened. After cleaning the Hummer is easily induced to fly down and re-enter its proper quarters. The larger cages are cleaned through back doors, without shifting the birds, but the keeper operates by placing himself inside movable panels, which constitute a portable cage. If a bird escapes, it cannot go far, and it returns almost immediately to its compartment.

'Birds behind glass cannot be heard, which is a pity, at the least for the largest number of them. We have remedied that by conducting the sound from the cages to the public hall by special devices. There is ample room at the back for spare cages and all sorts of feeding and cleaning facilities.

'The "Jewel Room" has proved a great success. It is, we think, an excellent show, and the birds are doing exceedingly well in it. The good effect obtained in the planted cages of the Jewel Room, as in other sorts of aviaries, depends entirely on two essential conditions: keeping the cages and the plants themselves meticulously clean, and also a wise choice of the birds inhabiting them. Species harmless to the kind of vegetation among which they are meant to live can only be placed there. Experience helps considerably of course, but without it, the only thing to do is to try



New York Zoological Society

A 'Jewel Room' Aviary, 1960

to watch, and to remove, the offenders as soon as they are caught damaging plants.

The plantings and rockwork of each cage were designed and selected by Captain Delacour himself.

The 'Jewel Room' innovation of brightly lit exhibits in a darkened hall was shortly adopted by many zoos. In 1948 Karl Plath redesigned the east and west wings of the Brookfield Zoo's bird house, creating a series of 'Picture Cages', some of them large enough for hornbills and toucans (Plath, 1949). The 'Hall of Living Jewels' was opened by Gerald Iles, at the Belle Vue Zoo in Manchester, in 1949 (Iles, 1950). This concept was carried to extremes by Walter Van den bergh, at the Antwerp Zoo where in January 1946 there was 'legally notified and registered' the display of birds in compartments without any kind of barrier, the only restraint being the bird's natural aversion to darkness (Barclay-Smith, 1948). At the Bronx Zoo itself, the 'Jewel Room' technique was extended to reptiles (Anon. 1944b), fishes (Atz, 1947) and small mammals (Crandall, 1947).

Captain Delacour's renovations of the Bird House were largely maintained until 1972 when 'The World of Birds' was opened, coinciding with the closing of the 1905 building. In 1960, three Tacazze Sunbirds *Nectarina tacazze* were hatched in one of the 'Jewel Room' cages, two surviving to independence (Conway, 1961). As far as I know, this remains the only fully successful breeding of sunbirds in any American zoo.

Exhibits very similar to the 'Jewel Room' remain in existence in many zoos, some of them quite recently constructed. One of the most successful is the hall of 'Living Jewels of the Bird World' at Denver Zoo's 1975 Bird House (Freiheit and Schmitt, 1977), where Green Wood Hoopoes, African Pygmy Kingfishers, and Blue-crowned Chlorophonias have bred.

While there has been a recent disenchantment with small display cases (Berry, 1983), Captain Delacour's Habitat Cages have become a standard technique for the indoor exhibition of birds. In the U.S., some of the most notable bird houses devoted entirely or primarily to mixed-species habitat or regional displays are at San Antonio, Houston, Columbia (South Carolina), Philadelphia, St. Louis and Denver. It is at the Bronx Zoo, however, that the two most famous and, still, most magnificent bird houses based on ecological or geographical assemblages are to be found, both conceived by William G. Conway. Conway, whom Delacour had 'noticed and appreciated long ago' (Delacour, 1966), General Director of the New York Zoological Society since 1962, also, rather amazingly, Curator of Birds from 1956 to 1973, personally designed the Aquatic Birds Building and 'The World of Birds'.



New York Zoological Society

Hummingbird Aviaries in the 'Jewel Room', including the one (centre) in which a pair of
 Tacazze Sunbirds *Nectarina tacazze* hatched three chicks in 1960

Opened in 1964 with the intention of showing 'the type of bird in the kind of place it lives' (Conway, 1966), the Aquatic Birds Building has long been recognised as a pivotal milestone in exhibit philosophy. Many of its exhibits, particularly 'The Sea Cliffs' and 'The Shore', have been widely copied. Among the many species bred there have been the first captive hatchings of the Tufted Puffin and Puna Plover.

'The World of Birds', opened in 1972, remains the single most elaborate installation expressly for birds in any zoo (Anon, 1972; George, 1975). For the sentimental, it is pleasant to note that, among the many habitat displays, there are, as in the 1940s, an Eastern North American forest, an 'arid scrubland' and a number of Asian and Tropical American exhibits, including the enormous South American rainforest.

Captain Delacour did not by any means confine his renovations to the Bird House. In the spring of 1941, Captain Delacour and Lee Crandall set about redesigning the Great Flying Cage, erected in 1900, transforming a rather barren summer display into a well-landscaped exhibit where a number of species were displayed year-round (Crandall, 1943). To allow for planting the aviary, the eight species and subspecies of pelicans, which had been located there traditionally, were transferred, wing-clipped, to the Zoo's Cope Lake, where pelicans continue to afford highly publicised amusement when they are caught up each year in the autumn.

Lake Agassiz gave Captain Delacour an opportunity to exhibit gibbons on an island, as he had at Clères, for the first time in any American zoo.

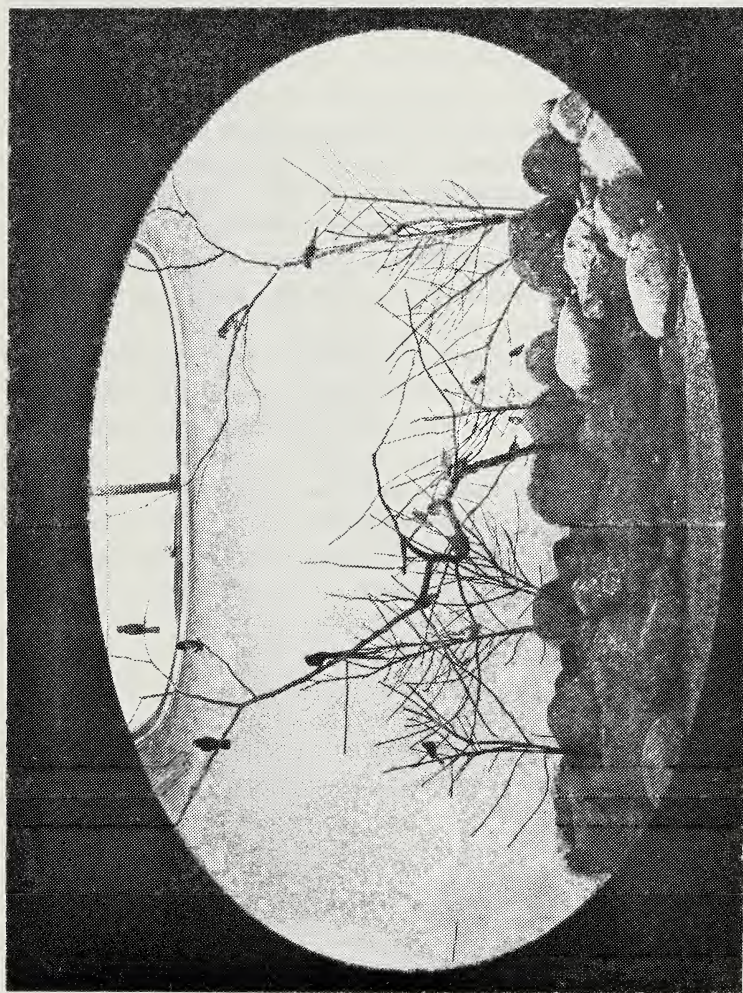
March-April 1942

'.....Knowing how interesting their arboreal life could be, I kept an eye open for a suitable exhibition place in the New York Zoological Park as soon as I joined the staff of the Zoo. An island near the southern shore of Lake Agassiz immediately recommended itself, having a fair number of good-sized trees and being not too far from the shore.....'

'In the trees on "Monkey Island" as we somewhat inaccurately call the gibbon and spider monkey exhibition island, the gibbons took instantly and naturally to tree-dwelling life. At times when they were calling in concert, I could stand on the shore and by shutting my eyes imagine that I was back at some half-forgotten camp in Indo-China where their antics and their ringing voices have charmed me innumerable times.'

"Gibbon Islands" are now almost a standard feature found, among other places, at San Diego, Santa Barbara, Kansas City, Oklahoma City, Denver, Brownsville and Minneapolis (indoors), as well as throughout the world.

While engaged in his many zoo activities Captain Delacour managed to



New York Zoological Society Photo
The Seedeaters' Aviary at the end of the 'Jewel Room', June 1945

take part in a United States Department of the Interior recovery programme for the Trumpeter Swan, which in 1944 had a known U.S. population of less than 250. The project is described in detail elsewhere in this memorial issue but as a result of this programme Trumpeter Swans became established at Jackson Hole (Wyoming), Lake Malheur and Ruby Lake (Delacour, 1966). There are now more than 1,500 outside Alaska (Todd, 1979).

1966

'I used to go to the Bronx Zoo three or four days a week and spent the balance of my time at the American Museum. I was given a comfortable office and all the help I could possibly wish for by the curators of the Department of Ornithology, Frank Chapman, Robert C. Murphy, James Chapin, John Zimmer and Ernst Mayr. I enjoyed the cordial and stimulating company, and I used the excellent collections under their care to the best of my ability.

'The American Museum of Natural History is one of the two or three best in the world, and it owes its high quality, for the most part, to the late Professor (Henry) Fairfield Osborn, its President for many years. I knew him well and I had the greatest respect for him. He was something of a prophet: he told me as early as 1926, during my first visit, that one day I would work at the American Museum. There seemed to be very little likelihood of it in those days, since I was engaged in so many activities elsewhere. His prediction, however, was perfectly correct: I still work at the Museum for several months each year and it has been my headquarters for zoological studies since 1942. I have written my papers and books there for over twenty years.....'*

In 1985, Dr. Delacour told me he had decided that year to close down his office at the American Museum.

July-August 1945

'I have long been personally interested in waterfowl. For over twenty years I kept at Clères several hundreds of these fascinating birds, representing all the known wild species with the exception of twenty-six. They lived there under almost natural conditions and many of them were breeding regularly. This enabled me to make countless observations which were

*(1857-1935). A chief founder of the New York Zoological Park, and its most influential board member, he was the father of Fairfield Osborn. Dr. Delacour told me: 'Osborn was very high-handed. He thought he was far superior to everyone! ...He was, in a way ...'

extremely valuable for the understanding of their relationship.

'I had already published several articles on the subject, notably in the "Proceedings of the VIIIth International Ornithological Congress, Oxford, 1934" (1938). Since, however, more has been learned, and at the suggestion of several American ornithologists, Dr. Ernst Mayr and I decided to sum up our knowledge in a new, more important paper in English. Our study has been published in the "Wilson Bulletin", Vol. 57, 1st March, 1945 (pp. 1-53), and I refer it to all persons interested. Our object has been to effect a more natural grouping as species with a better understanding of their affinities expressed in a simpler taxonomy.

'The conventional classification of waterfowl usually so far adopted is founded on a small selection of morphological characters, primarily the shape of the bill and feet. Nothing could be more misleading, as these are entirely functional and undoubtedly often recently acquired representing merely a secondary adaption, that is repeated in widely separate groups. We have used on the contrary a number of nonadaptive characters: pattern of tarsus, plumage pattern in adults and chicks, posture, general body proportions, length of neck and shape of head, internal anatomy and more particularly biological peculiarities. Habits and behaviour are of paramount importance, for they are deeply rooted and usually the product of very ancient evolution. In the waterfowl family the main points are pair formation, displays, nesting, and feeding habits.

'We believe in large genera, since it is the function of generic names to express relationship not distinctness, which is expressed by the species name.'

Dr. Delacour was a pioneer, with Ernst Mayr, of 'the new systematics' (Mayr, 1986) based on supposed evolutionary relationships and inferred common descent rather than entirely on structure (Mayr, 1969), thus his emphasis upon morphological and behavioural features upon which natural selection has not had a strong influence, in other words, 'non-adaptive characters'.

From this perspective, Dr. Delacour examined the relationships of the members of the Anatidae (Waterfowl), Pycnonotidae (Bulbuls), Nectarinidae (Sunbirds), Estrildids (Waxbills, Mannikins, etc.) and Phasianines (Pheasants) and many genera, such as Scops Owls *Otus* and Crow-tits or Parrotbills *Paradoxornis*, resulting in a great assemblage of papers, as well as his magnificent monographs of Pheasants (1951) and Waterfowl (1954-64).

A major taxonomic legacy of Dr. Delacour are the large genera he created from plethoras of small, often monotypic ones. The hodge-podge of 'Gallo-Pheasants' - *Gennaeus*, *Hierophasius*, *Houppifer*, *Lophura*,

Diardigallus and *Lobiophasius* - he united under *Lophura* (Delacour, 1949), while the Goose genus *Anser* was made to absorb *Chen*, *Philacte*, *Cygnopsis* and *Eulabia* (Delacour & Mayr, 1945).

Throughout the war Captain Delacour was not only publishing scientific papers, but wrote almost continuously for avicultural publications, especially the *Avicultural Magazine* and *Aviculture*, the journal of the Avicultural Society of America. He became President of the Avicultural Society of America in 1950, and in 1951 arranged for the publication of its members' articles in the *Avicultural Magazine* (Delacour, 1951), a policy that was to continue happily for a number of years.

November 1944

'Today I have come back to where I stood when I was five years old. I personally own two birds: a Roller Canary in my bedroom, and a very good Shama, a present of a kind friend, Mrs. E. Erlanger, which enlivens my charming office at the Bronx Park. As I write, he sings delightfully.

'The New York Zoo collection, it is true, is excellent; I have rearranged the cages to suit my taste, and I admit that it is the best possible compensation for the loss of my own birds, now all killed or dispersed. Still nothing can ever replace them

September 1945

'....Nowhere - and I have seen most of the public zoological gardens on every continent - have I found another institution with the burning faith in the educational possibilities and scientific study of animal life, and the determination to bring its dreams to fruition, that the New York Zoological Society displaysI say it again: the New York Zoological Society is unique in its purposes, ideals and accomplishments.'

March-April, 1946

(In an article about birds at semi-liberty at Villers-Bretonneux and at Clères, 1905-1940).

'All this is a thing of the past at Clères. But Mr. F.E. Fooks is back there, and this past has a fair chance to be partly revived in the near future. As a link, I hear that a Festive Amazon, which we brought over from South America and liberated in 1921, is still to-day flying around the Manor House and the terrace. If he could talk better than he does, he would no doubt tell much, and some of his stories would probably bring tears to all my friends who knew Clères in its former splendour.'

February 1947

'The animals coming to us in New York were captured as fawns at birth last spring and were reared by goats at Whipnade. Coming here, they were

under the care of F.E. Fooks, the director of my own park at Clères in France.'

Thus arrived in 1946 the first Père David's Deer in the Western Hemisphere.

Frank Fooks departed New York on 16th January 1947 (Anon, 1947), with a shipment of birds from the Bronx Zoo which formed part of the nucleus of the new collection at Clères, which was officially reopened in May 1947 as a public zoological park.

Captain Delacour left his position as Technical Adviser to the New York Zoological Society in 1947, in order to supervise the rebuilding of Clères. His cordial association with the Zoological Society continued, however, especially as he spent every autumn in New York until 1984, spending three or four months each year at the American Museum of Natural History. When the position of Field Associate in Ornithology of the New York Zoological Society was created during the Conway administration, he was at once thus appointed and remained so for the rest of his life.

ACKNOWLEDGEMENTS

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TABLE I. CHARLES CORDIER'S COLOMBIAN COLLECTION

9th DECEMBER, 1941

(Adapted from Bridges, 1942)

*New to aviculture

1 Green-headed Wood Nymph	<i>Thalurania fannyi verticeps</i>
2 Wilson's Incas	<i>Coeligena wilsoni</i> *
5 Heavenly Sylphs	<i>Agelaiocercus c. coelestis</i> *
5 Black-billed Emeralds	<i>Chlorostilbon melanorhynchus</i>
5 White-footed Racket-tails	<i>Ocreatus u. underwoodi</i> *
1 Green-headed Emerald	<i>Agyrtia viridiceps</i>
2 White-tipped Hummingbirds	<i>Urosticte b. benjamini</i> *
1 Empress Eugenie's Hummingbird	<i>Eugenia imperatrix</i> *
4 Western Red-headed Barbets	<i>Eubucco bourcieri occidentalis</i> *
12 Scarlet Cocks-of-the-Rock	<i>Rupicola peruviana saturata</i> *
1 Club-winged Manakin	<i>Allocoptes deliciosus</i> *
1 Colombian Red Tanager	<i>Piranga flava desidiosa</i>
2 Crimson-backed Tanagers	<i>Ramphocelus d. dimidiatus</i>
2 Red-rumped Tanagers	<i>R. f. flammigerus</i>
7 Yellow-rumped Tanagers	<i>R. f. icteronotus</i>
1 Green-backed Mountain Tanager	<i>Anisognathus flavinuchis victorini</i> *
2 Blue-winged Mountain Tanagers	<i>A. f. cyanopterus</i>
1 Southern Emerald Tanager	<i>Tangara florida auriceps</i>
15 Western Golden Tanagers	<i>T. arthus occidentalis</i>
2 Rufous-throated Tanagers	<i>T. rufigula</i>
3 Ecuadorian Bay-headed Tanagers	<i>T. gyrola nupera</i>
1 Rufous-headed Tanager	<i>T. vitriolina</i>
1 West Colombian Buff-naped Tanager	<i>T. r. ruficervix</i>
4 Andean Black-headed Honeycreepers	<i>Chlorophanes spiza subtropicalis</i>

TABLE II. CHARLES CORDIER'S COSTA RICAN COLLECTION

9th OCTOBER, 1942

(Adapted from Delacour, 1943)

*New to aviculture

3 Costa Rican Tree Partridges	<i>Dendrotyx leucophrys hypospodius</i> *
3 Delattre's Sabre-wings	<i>Campylopterus hemileucurus</i>
6 Rose-throated Flame-bearers	<i>Selasphorus flammula</i> *
1 Scintillant Flame-bearer	<i>S. scintilla</i> *
10 Southern Green Violet-ears	<i>Colibri thalassinus cyanotus</i> *
7 Guimet's Flutterers	<i>Clais guimeti</i> *
12 Costa Rican Fire-throats	<i>Panterpe insignis</i> *
3 Admirable Hummingbirds	<i>Eugenes fulgens spectabilis</i> *
3 Princess Helena's Coquettes	<i>Lophornis helenae</i> *
1 Costa Rican Snow-cap	<i>Microchera parvirostris</i> *
2 Costa Rican Mountain Gems	<i>Oreopyra castaneoventris caloema</i> *
4 Coppery-headed Emeralds	<i>Elvira cupreiceps</i> *
18 Costa Rican Quetzals	<i>Pharomacrus mocinno costaricensis</i>

1 Lesson's Motmot	<i>Momotus lesonii</i>
1 Mexican Ant-thrush	<i>Thamnophilus doliatus mexicanus*</i>
3 Bare-throated Umbrella Birds	<i>Cephalopterus glabricollis*</i>
4 Southern Long-tailed Manakins	<i>Chiroxiphia linearis fastuosa*</i>
4 Golden Manakins	<i>Manacus aurantiacus*</i>
2 Yellow-thighed Manakins	<i>Pipra mentalis ignifera*</i>
1 Velvety Manakin	<i>P. coronata velutina*</i>
1 Kentucky Warbler	<i>Oporornis formosus</i>
6 Montezuma Oropendolas	<i>Psarocolius montezuma</i>
2 Elegant Blue-hooded Euphonias	<i>Euphonia musica elegantissima</i>
2 Dow's Tanagers	<i>Tangara d. dowii</i>
1 Northern Red-legged Honeycreeper	<i>Cyanerpes cyaneus carneipes</i>

TABLE III. CHARLES CORDIER'S GUATEMALAN COLLECTION

15th MARCH, 1947

(Adapted from Cordier, 1947a)

*New to the collections of the New York Zoological Park

1 Great Curassow	<i>Crax r. rubra</i>
17 Guatemalan Crested Bob-white	<i>Colinus leucopogon incanus*</i>
2 White-bellied Cayenne Wood Rails	<i>Aramides cajanea albiventris*</i>
2 Northern Band-tailed Pigeons	<i>Columba f. fasciata</i>
1 Cinereous Ground Dove	<i>Claravis pretiosa</i>
1 White-winged Dove	<i>Zenaida a. asiatica</i>
1 Pallid Lesser Roadrunner	<i>Geococcyx velox pallidus*</i>
1 Grey-headed Pigmy Owl	<i>Glaucidium minutissimum griseiceps*</i>
1 Garnet-throated Hummingbirds	<i>Lamprolaima r. rhami*</i>
1 Green-throated Cazique	<i>Lampornis v. viridi-pallens*</i>
3 Guatemalan Cazuques	<i>L. amethystinus salvini*</i>
8 Green-headed Admirable Hummingbirds	<i>Eugenes fulgens virideiceps*</i>
11 White-eared Hummingbirds	<i>Hylocharis l. leucotis*</i>
1 Guatemalan Broad-tailed Hummingbird	<i>Selasphorus platycercus guatemalae*</i>
1 White-bellied Amazilia	<i>Amazilia c. candida*</i>
1 Cinnamomeus Amazilia	<i>A.r. rutila*</i>
3 Northern Green Violetears	<i>Colibri t. thalassinus*</i>
2 Guatemalan Hermits	<i>Phaethornis superciliosus longirostris*</i>
1 Dusky Hermit	<i>P. longuemareus saturatus*</i>
8 Elegant Trogons	<i>Trogon e. elegans*</i>
3 Massena Trogons	<i>T.m. massena*</i>
2 Northern Violet Trogons	<i>T. violaceus braccatus*</i>
4 Chestnut-headed Motmots	<i>Momotus mexicanus castaneiceps*</i>
1 Van Rossem's Turquoise-browed Motmot	<i>Eumomota superciliosa vanrossemi*</i>
3 Southern Keel-billed Toucans	<i>Rhamphastos sulphuratus brevicarinatus</i>
3 Santa Cruz Woodpeckers	<i>Centurus aurifrons santacruzi*</i>
1 Cabot's Woodpecker	<i>Veniliornis oleaginus sanguinolentus*</i>
1 Northern Thin-billed Woodhewer	<i>Lepidocolaptes souleyettii insignis*</i>

5	For-tailed Flycatchers	<i>Muscivora tyrannus</i>
5	Mexican Tityras	<i>Tityra semifasciata personata</i> *
6	Cande's Manakins	<i>Manacus candei</i> *
1	Bang's Magpie-Jay	<i>Calocitta formosa pompata</i> *
5	Ridgway's Jays	<i>Cyanocitta stelleri ridgwayi</i> *
2	Guatemalan Cactus Wrens	<i>Heleodytes capistratus xerophilus</i> *
2	White-breasted Blue Mocking-thruses	<i>Melanotis hypoleucus</i> *
1	Guatemalan Blue Solitaire	<i>Myadestes unicolor veraepacis</i> *
2	Guatemalan Brown Solitaires	<i>M. obscurus oberholseri</i> *
3	Rufous-collared Robin	<i>Turdus rufitorques</i> *
1	Guatemalan Black Robin	<i>T. infuscatus</i>
2	Guatemalan Silky Flycatcher	<i>Ptilogonys cinereus molybdophanes</i> *
2	North American Oven Birds	<i>Seiurus aurocapillus</i>
10	Guatemalan Orioles	<i>Icterus gularis gigas</i> *
2	Great-tailed Grackles	<i>Cassidix m. mexicanus</i>
1	Grey-headed Tanager	<i>Eucometis penicillata spodocephala</i> *
3	Tabasco Ant Tanagers	<i>Habia fuscicauda salvini</i> *
1	Belize Red Tanager	<i>Piranga flava figlina</i> *
3	Crimson-collared Tanagers	<i>Ramphocelus s. sanguinolenta</i> *
5	Passerini's Silver-billed Tanagers	<i>R.p. passerinii</i>
1	Gould's Euphonia	<i>Euphonia g. gouldi</i> *
8	Mexican Chlorophonia	<i>Chlorophonia o. occipitalis</i> *
1	Northern Lady Wilson's Tanager	<i>Tangara l. larvata</i>
3	Northern Black-headed Honeycreepers	<i>Chlorophanes spiza guatemalensis</i> *
2	Guatemalan Diglossas	<i>Diglossa baritula montana</i> *
2	Indigo Buntings	<i>Passerina cyanea</i>
2	Painted Buntings	<i>P.c. ciris</i>
2	Guatemalan Juncos	<i>Junco phaeonotus alticola</i> *
1	Black Seedeater	<i>Sporophila americana corvina</i>

JEAN DELACOUR'S CONTRIBUTION TO THE ORNITHOLOGY OF FRENCH INDO-CHINA

By ALAN GIBBARD
(Reigate, Surrey)

At the end of the Great War, the lands that formed the region then known as French Indo-China were still largely unexplored by naturalists. The world's natural history museums contained a small number of specimens from this remote region, largely obtained by French missionaries with an interest in zoology.

The Paris Museum contained specimens of such wonderful birds as the Giant Ibis *Pseudibis gigantea*, Edward's Pheasant *Lophura edwardsi*, Crested Argus Pheasant *Rheinardia ocellata*, Renault's Ground Cuckoo *Carpococcyx renauldi*, and Elliot's Pitta *Pitta ellioti*, and these inspired Jean Delacour to commence a series of expeditions to Indo-China, and to undertake a thorough zoological survey of the country.

Between 1923 and 1938 Jean Delacour led seven expeditions to Indo-China, and was able to explore every part of the region. The areas covered by these expeditions were as follows:

- 1923-1924: Central Annam, and a general survey of the country.
- 1925-1926: Northern Laos.
- 1926-1927: Eastern Tonkin, Southern Annam and Northern Cochin China.
- 1927-1928: Cambodia, Cochin China, Central Laos and Northern Annam.
- 1929-1930: Tonkin and Northern Annam.
- 1931-1932: Southern Laos.
- 1938-1939: North-western Laos.

From the first expedition Jean Delacour was assisted by Pierre Jabouille, then Governor of French Indo-China, and he had already made collections of birds and other animals and sent them to the Paris Museum. Jabouille was to remain Delacour's co-worker throughout the seven expeditions, and their collaboration resulted in the joint authorship of *Les Oiseaux de L'Indochine Francais* (four volumes, 1931) which is still the standard work on the avifauna of the region.

As well as Pierre Jabouille, Jean Delacour was accompanied at various times by other notable naturalists including J.C. Greenway, A. David-Beaulieu, P. Engelbach and Willoughby Lowe. Over the period of the

expeditions some 30,000 birds and 8,000 mammals were collected, together with a vast quantity of insects and other forms of animal life. The majority of the collections were presented to the Paris Museum, although a number also went to the British Museum and to Lord Rothschild's collection at Tring.

A large number of living creatures were also brought home by the expeditions, and most of these went to Jean Delacour's estate at Clères although a number went to the private collections of Alfred Ezra, J. Spedan Lewis and Madame Lecallier, as well as to various zoos. The collections contained a huge number of species new to aviculture, and some of the more spectacular species included the Imperial Pheasant *Lophura imperialis*, discovered on Delacour's first expedition, Edward's Pheasant *L. edwardsi*, Crested Argus Pheasant *Rheinardia ocellata*, Renault's Ground Cuckoo *Carpococcyx renauldi*, Blue-throated Bee-eater *Merops viridis* and Elliot's Pitta *Pitta ellioti*. Many reared young, and it is doubtful if aviculturists in the West will ever again have the opportunity to see some of these wonderful species in captivity.

Jean Delacour's work in Indo-China filled huge gaps in the scientific knowledge of the area, and his collections have provided a foundation for zoological research that, due to the current political situation in the region, may be impossible to supplement. The vast amount of energy that Dr. Delacour devoted to his research in Indo-China is all the more remarkable when one considers that at the time he was also building up his great private collection at Clères, writing many important papers, and serving on the councils of several international societies.

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DR DELACOUR AND THE TRUMPETER SWAN RESCUE PROGRAMME

By KENNETH DOLTON
(Worcester)

Whilst Dr. Delacour wrote many articles on all aspects of aviculture, I have always associated him with waterfowl and as swans are the most majestic of all water birds, I would like to reprint his article, 'The Fate of the Trumpeter Swan', from the November-December 1944 issue of the *Avicultural Magazine*. I am sure that many readers who do not possess this old issue will be very interested to read of this project.

May I say that the status of the Trumpeter Swan has improved since the article was written and, according to information given to me by Mr. J.B. Blossom, Assistant Director of the Wildfowl Trust, there are now 325-350 swans on Red Rock Lakes, Montana, and 150 birds in the Yellowstone Park, Wyoming (figures given by the Trumpeter Swan Society, 1984). There was also a population of 5,000 birds in Alaska according to the Swan Symposium Report, 1981.

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THE FATE OF THE TRUMPETER SWAN

By J. DELACOUR

Of the seven existing species of Swans, the Trumpeter is the largest. Leaving aside the two smaller southern species, the Black from Australia and the Black-necked from South America, it surpasses in size and strength the other five northern species. To give a rough idea of it the average wing length of the Trumpeter is 665 mm., while that of the popular, semi-domestic Mute Swan is 590 mm. In shape and behaviour the latter bird is, of course, quite distinct. The two other White Swans of Europe and Asia, the Whooper and Bewick's, and the two American species, the Trumpeter and the Whistler, are closely allied and have the same general appearance. They cannot raise their wings in anger as the Mute and Black do; they hold their neck straight most of the time, and they have a resounding, bugle-like voice, varying in intensity, but, generally speaking, of a similar quality.

It is a curious, but by no means a unique fact, that each continent should possess two such closely related species. At first sight one would be inclined to consider them all as subspecies of the same species. But the breeding ranges of the Whooping (*Cygnus cygnus*) and Bewick's (*Cygnus c. bewicki* and *C. c. jankowskyi*) overlap. Those of the two American forms, however, do not, the Whistling Swan (*C. columbianus*) nesting in the north of Alaska and Canada, while the Trumpeter (*C. buccinator*) lives and breeds in the interior of the western United States and British Columbia.

From a strictly systematic point of view the Trumpeter, the Whistler, and the Whooper could possibly be considered as three subspecies of the same species or, at any rate, as forming a superspecies. Or the Trumpeter and the Whooper may be two subspecies of the same species, as also the Whistler and the Bewick's. As it is impossible to decide, the safest course is to call these Swans four species, very closely related.

To give an idea of the relative size of all these birds it can be pointed out that their average wing measurements are as follows :—

Trumpeter .	665 mm.
Whooper .	604 mm.
Whistler .	550 mm.
Bewick's .	526 mm.

The other principal differences in these Swans is the presence, extent, or absence of a yellow patch on their bill. Generally speaking the Whooper has the basal two-thirds yellow; the Bewick's only one-third; the Whistler has a small yellow mark on the sides, near the forehead; and the Trumpeter has a wholly black bill. Unfortunately many Whistlers lack the yellow spot and it is often very difficult to distinguish them from Trumpeters. On the whole Trumpeters are a good deal larger and have a heavier bill and a longer neck, but between a small Trumpeter and a large Whistler there are few obvious differences. Some of the latter have a wing of 580 mm., while some specimens of Trumpeters have it as short as 530 mm. In such cases the only sure character is the voice—much deeper in the Trumpeter, and if the bird is dead and can be dissected the shape of its trachea, or windpipe, is a certain proof of its identity. In the Trumpeter it makes a vertical loop over a lump on the breast-bone (sternum), and emerges through a separate opening. In the Whistler this loop does not exist, and there is only one hole for the entrance and exit of the windpipe.

The Trumpeter is a rather sedentary bird compared to the other three which nest in the far north and winter comparatively far south, being truly migratory. The Trumpeter travels only in search of open water and food. In other words it breeds as far south as it can and winters as far north as possible, while the other three species do exactly

the reverse.

These life habits have been almost fatal to Trumpeters. In former days they ranged all over the centre of western North America, from British Columbia to California, east to Manitoba, Minnesota, Iowa, Missouri, Arkansas, and Colorado. It was supposed even to reach the coast of California and the Gulf of Mexico. But it seems unlikely that the species ever went so far, and more probably black-billed Whistlers have been erroneously recorded as Trumpeters.

Because of these more or less sedentary habits which resulted in their nesting and wintering in areas which became settled by man when the country was opened up Trumpeter Swans were sooner slaughtered than the other species, which up to these days, have enjoyed relative security at least in their breeding grounds in the North. The Whistling Swan, now adequately protected, is still extremely abundant, but the Trumpeter is making its last stand in the wilds of British Columbia and in a few protected spots in Montana (Red Rock Lakes) and Wyoming (Yellowstone National Park). It has disappeared from all other parts of its former range.

Some years ago there were supposed to be a few hundred birds in British Columbia and under sixty in the United States. To-day the position is a little more hopeful. Thanks to the establishment of the Red Rock Lakes Refuge, their last stronghold, there are some 180 birds in it to-day as well as about fifty in the Yellowstone. No really accurate census of the Canadian birds has yet been taken, but 500 is their estimated number. In Montana, however, their increase has been slowed up during the last few years, and the Fish and Wildlife Service (Department of the Interior) of the United States Government is trying to remedy this regrettable state of things. Having recently been appointed a collaborator of the Service, and acting as an adviser, I have inspected in May, 1944, the present haunts of the Trumpeter Swans, and possible locations where the birds could be established.

The following extracts of my report will give an idea of our present project to propagate and save the species :—

“According to instructions from the Director of the Fish and Wildlife Service, dated 2nd May, 1944, I arrived at Portland, Oregon, on 16th May and left the next day in the company of Mr. Leo L. Laythe, Regional Director, for the Malheur Lake Refuge, where we arrived on the same day and stayed until 19th May.

“We inspected different spots in the Refuge which could be favourably used for the establishment under control of young birds and of breeding pairs of Swans.

“On the 20th we visited the Elk Refuge, Jackson, Wyoming, where three Trumpeter Swans have been introduced, but so far have not attempted to breed, the odd bird probably interfering with the other two. Furthermore, their sex remains unknown. We also inspected spots where breeding pens could be established later on.

"From 21st May to the 23rd we were at Red Rock Lakes Refuge, where we observed a number of Swans and gathered much valuable information from the Manager, Dr. Ward M. Sharp, and his fellow workers. It appears that the breeding Swans have no difficulties in rearing their broods, that they are not appreciably disturbed by predators, and that it is easy, as it has been proved in the past, to capture young Swans before they can fly, during the late summer.

"It is proposed that all cygnets captured (half of the 1944 crop) will be deposited at Malheur Lake, in a large pen encircling several acres of open water, eminently suitable for the purpose. Mr. Laythe and I have given to Mr. J. Scharff, Manager of the Refuge, all the necessary instructions for their installation.

"A large number of young Swans, under three years of age, can be kept together there. In two years' time suitable pens for breeding pairs will be built and the birds separated. I advise that not more than six pairs should be kept at any one Refuge, in the beginning, in order to divide the risks. Such pairs could possibly be established at Malheur Lake, Elk Refuge, Ruby Lake, Camas, etc. . . .

"Conditions necessary to ensure the success of the project are as follows :—

"1. Captive birds must be housed far enough away from localities where wild Trumpeter Swans live as the latter would fly in and attack the captive birds.

"2. There must be some open water during the coldest weather.

"3. Each pen should be set in a 'natural' and sheltered spot so that each pair of birds feels at home. It should include one acre of water and one of land as a minimum.

"4. Trumpeter Swans, particularly the chicks, suffer from the summer heat. They must be housed in places where the summer is cool. Winter temperature is unimportant.

"5. Pens must be free of the danger of botulism.

"6. Waters where snapping turtles occur are unsuitable for the purpose of breeding all wildfowl.

"7. Pens must be vermin-proof, and predators, both mammals and birds, must be controlled in the neighbourhood.

"Under such conditions breeding successes are certain as it has been proved in Holland, France, and England during fifty years. Trumpeter Swans become adult at the age of three years, and they will usually breed when four or five years old if they are submitted to favourable conditions and treatment. Once started they become regular breeders.

"In the United States the Trumpeter Swan population at present is just over 200, roughly speaking, and that is a dangerously low level. Like all large birds breeding in an inhabited country they would soon disappear in a purely free and unprotected state and, in fact, they have only survived through artificial help. There is no prospect that sufficiently extensive suitable wild conditions can ever be restored.

Thus it is imperative to compensate man's encroachments by appropriate measures such as winter feeding and controlled breeding.

"A comparatively small proportion of the present population is now breeding, about 20 per cent, and many birds remain long unmated. This is probably caused by the scarcity of available nesting sites. Old mated pairs are extremely jealous and savage during the breeding season, they keep to themselves a large territory and younger birds are unable to appropriate any. The only remedy is to remove some of the young birds and give them a chance to breed elsewhere.

"Their introduction in a free state into another refuge has proved a failure so far and should be discontinued in its present form. A better method is to breed them in captivity and, later on, to stock suitable areas with the young produced, under special management. Also, the fact that a number of breeding birds exist under control in different refuges will avert forever the threat of the extinction of the species. That Trumpeter Swans respond readily to reasonable captive conditions has been proved in Europe."

As many of our readers will remember Trumpeter Swans have been very successfully kept and reared in Europe in the past. The late F. E. Blaauw bred some regularly since 1902, and long before they nested successfully in France and in England. There is a record as early as 1873. At the time of the dispersion of the Blaauw collection in 1937 there were still sixteen Trumpeters at Gooilust, four being hatched the same year. They all went to Woburn Abbey, where the late Duke of Bedford already had, if I remember correctly, four specimens. I hope that these rare birds still live and that they have since increased in number. They are the only ones in Europe.

In the course of years many young birds reared at Gooilust were disposed of. I acquired several as early as 1919, and others were sold later on to different zoos and parks, even to America, where four were purchased by the New York Zoo, while others went to the Kellog Sanctuary in Michigan.

It is therefore very probable that a good number of breeding pairs will have been established within a few years in America. I intend to do all I can towards this end, the only safe method to save from extinction this most remarkable species, the largest of all Anatine Waterfowl.

APPENDIX

At the end of August and early in September I was again at the Red Rock Lakes Refuge, in Montana.

The last census made showed the existence of 169 adult and 62 young Swans, a satisfactory increase certainly due to better management and heavier winter feeding.

Two cygnets have been hatched and reared without difficulty by broody hens, from wild collected eggs, according to my instructions. The robbed pair, however, did not nest again as hoped.

We quickly captured twenty cygnets on the shallow, weed-filled lakes. They are easily run down in a boat. The sight of the flying adult birds was magnificent, and they were not unduly disturbed, remaining in the vicinity during the operation.

The cygnets, six to ten weeks' old, proved fearless and tame from the beginning. They started feeding on green food, bread, and wheat as soon as they were released in a small pen with a pool.

The 700 miles' journey to the Malheur Lake Refuge, in Oregon, took three days, and was successfully effected in a lorry fitted with especially built crates, each containing two birds.

On arrival the cygnets were rested in a pen for twenty-four hours, then pinioned and placed in a large enclosure including a 3-acre pond fed by strong springs, where they will remain until they reach their third year.

A visit to the Yellowstone National Park showed that the Trumpeter Swans just hold their own there. They number now forty-four adult and eleven young birds. Too many nests are destroyed and too many cygnets are killed by predators. Steps will be taken to obviate these dangers in the future.

* * *

A MEMORY OF JEAN DELACOUR

By DEREK GOODWIN

(Petts Wood, Kent)

I cannot claim to have been in any sense a friend or close associate of Jean Delacour. I did, however, meet and talk with him on many occasions when he visited the old Bird Room of the British Museum (Natural History) in South Kensington, where I worked for many years. He certainly made a great impression on me as, I imagine, he must have done on all who met and spoke with him, however briefly.

Jean Delacour's many and wide-ranging contributions to aviculture and ornithology will, I am sure, be dealt with elsewhere in this memorial issue, by others better qualified than I to do so. He was, or so I have always assumed, a very rich man. Many rich people appear to get little enjoyment out of their wealth and give little benefit from it. He used his to further his own undoubted talents and to bring a great deal of knowledge and pleasure to others.

Friendliness and forthrightness appeared to me to be keynotes of his character. I always recall with gratitude his enthusiasm and encouragement (which meant a lot to me then) when, in the late 1940s, I told him of some observations I had made on my Golden Pheasants.

It is, perhaps, easier and less hazardous for the rich to be frank. Even so, many rich people (like the rest of us) trim their verbal sails to current political and social winds lest men and the media speak ill of them. Not Jean Delacour! If the conversation turned to politics, race or other 'sensitive' subjects he said what he thought, not what he thought others thought he *ought* to think.

At least one or two of his prophecies in this line, uttered around 30 years ago and then, indeed still, very much 'against the official line' have proved only too lamentably true. But, being a less courageous person myself, I shall not 'stick my neck out' by citing them here or elsewhere.

It is obvious that Jean Delacour will be missed as an outstanding and gifted aviculturist and ornithologist. I think he will also be missed as an honest, kindly, helpful and very intelligent individual whose death is a loss for all who knew him, even if, like myself, only a little.

JEAN DELACOUR: FAMOUS AVICULTURIST AND AUTHOR A PERSONAL TRIBUTE

By Professor CARL NAETHER
(Encino, California, USA)

As one of a great many of Jean Delacour's American friends and admirers, I welcome this opportunity of paying a well-deserved tribute to this great birdman's character and accomplishments.

Well over 50 years ago, I had the privilege of meeting this charming Frenchman (long since become an American citizen) for the first time. Since then, personal visits to his beautiful 'retreat' in Clères, France, to his administrative office at the Los Angeles Museum of Natural History which he headed, and in Los Angeles City proper, where he and his mother occupied a spacious mansion with an adjoining, beautifully landscaped garden and aviary housing rare flamingos, hummingbirds, fruit pigeons among numerous other attractive species. These friendly meetings gave me a good opportunity to learn to know, and very soon to appreciate, this gentle man's character and personality.

What impressed me most favourably were Jean Delacour's friendliness, modesty and, of course, the wide scope of his ornithological knowledge, greatly enriched as it was by his expeditions into foreign lands in search of rare pheasants and other birds, the very distinctive collections of many different species of small and large birds which he maintained at Clères and in Los Angeles, and finally and very importantly, by his extensive publications of magazine articles and books.

Jean's friendliness manifested itself in the disarming ease with which he welcomed strangers and visitors to his offices as well as his aviaries by engaging them quickly in informal conversation on their favourite subjects, and branches of aviculture. Strangers meeting him for the first time were immediately and favourably impressed by this man's outright sincerity. Jean was no poseur. His open, appealing personality 'came clear and through' at a first meeting, thus readily paving the way for a continuing and usually long-lasting friendship.

A most pleasing and appealing quality of this friendship was this man's charming modesty. In my many years of engaging him in, and listening to, his conversations there was never the slightest boast of personal accomplishments, yet every opportunity to commend his listener to what he had done well was eagerly seized by Jean.

He was the 'soul of discretion', and as far as I know never spoke ill of any person, not even in cases where certain censure of avicultural practices,

as in selling and advertising birds, might have been justified.

Perhaps Jean Delacour's most helpful and finest personal trait was his eager willingness to help aspiring aviculturists by answering the multitude of questions arising from keeping and breeding foreign birds in captivity. He went to great lengths to reproduce birds' natural habitats in captivity and was eager to write about his methods of maintaining and breeding them. He did not believe in keeping information secret.

In conclusion, this writer regards Jean Delacour as one of our most important and successful aviculturists, whose authoritative writings will serve as an enduring and noble testimony of useful, efficient and thoroughly worthwhile human effort.

* * *

JEAN DELACOUR AND THE AVICULTURAL MAGAZINE

By JOSEF LINDHOLM III

(Berkeley, California, USA)

From 1916 to 1977 there was no volume of the *Avicultural Magazine* which did not contain at least one contribution by Dr. Delacour. With the articles and memorials written in 1979, 1980 and 1982, there is a grand total of 279, covering 66 years, from the age of 25 to 91.

Over this span, six periods may be designated:

1. 1916-1918: Delacour's last years at Villers-Bretonneux, his family estate in Picardy, destroyed near the end of the war, where he had established his first, monumental collection. Delacour was in active military service throughout this time.
2. 1919-1940: The 'Golden Age' of Clères. It was during this time that Delacour led the great expeditions to Indo-China and Madagascar, and travelled and collected around the world. From 1923 to 1931 Delacour wrote the major portion of *Aviculture*, a compendium of avicultural knowledge to that time, initially serialised in the *Avicultural Magazine* and *L'Oiseau*.
3. 1941-1947: The New York years, when Captain Delacour was Technical Advisor to the New York Zoological Society and conducted extensive taxonomic research at the American Museum of Natural History, a partial result being his monographs of the Pheasants and the Waterfowl. He was also employed by the U.S. Department of the Interior in the effort to restore the Trumpeter Swan.
4. 1947-1951: The restoration of Clères as a public exhibit, bequeathed to the French Government, was supervised by Delacour. In 1951, as President of the Avicultural Society of America, he arranged for the publication of its members' articles in the *Avicultural Magazine*, a situation that prevailed until 1960.
5. 1952-1960: The Los Angeles years, when Captain Delacour was Director of the Department of History, Sciences and Art for the County of Los Angeles. He established a small but important collection of birds at Los Angeles, while continuing to direct the restoration and improvement of Clères.
6. 1960-1982. 'Retirement'. Captain Delacour was mandatorily retired from the Los Angeles Museums, at the age of 70, only under protest. Until practically the end of his life he maintained the routine he established then, spending the spring and summer at Clères, the autumn in New York

and part of the winter in Los Angeles, with a great deal of travelling as well. He maintained an office at the Department of Ornithology at the American Museum of Natural History until 1985. Only an increasing arthritis of the hands ended his writing, to his very great annoyance.

Throughout these contributions runs an endless enthusiasm and curiosity, at once avicultural and ornithological, resulting in such achievements as the discovery of the Imperial Pheasant in Viet Nam (1923) or the Luzon Parrot Finch in a pet store in Los Angeles (1937). There is also a continuous delighted amazement - at Papuans growing Zinnias and Marigolds (1963), or the arboreal Giant Anteater at Ravenna (1965). At the same time, there sometimes pervades a dismay at a world so often uglier and less reasonable than needs be, of which Dr. Delacour grew increasingly fond of saying that he had seen enough by the age of 95.

Although Dr. Delacour published his work in systematic ornithology in *The Ibis*, *The Auk*, publications of the New York Zoological Society, or the American Museum of Natural History, and other scientific journals, his *Avicultural Magazine* articles are replete with novel ornithological observations, and a number deal specifically with systematics, for example, the relationship between most honey-creepers and the tanagers (1972).

Overall, Jean Delacour's 66 years of contributions to the *Avicultural Magazine* are an amazingly thorough record of his own avicultural achievements, and those of many friends and institutions, work that has established so much of what we have today.

* * *

JEAN DELACOUR'S CONTRIBUTIONS TO THE AVICULTURAL MAGAZINE, 1916-1982

By ALAN GIBBARD
(Reigate, Surrey)

Jean Delacour submitted his first article to the *Avicultural Magazine* shortly before enlisting as a liason officer in the French Army in 1916.

Over the next 60 years, Jean Delacour contributed over 250 articles to this magazine, detailing his remarkable private collection at Clères, giving news of friends' aviaries, reporting on his numerous expeditions and a large variety of other avicultural and ornithological matters.

My original intention was to attempt a complete bibliography of Jean Delacour's published writings in all journals. However, I soon realised that it would almost require a separate publication in itself to list many hundreds of papers published in *The Ibis*, *The Auk*, *L'Oiseau*, *Animal Kingdom*, *Wilson Bulletin* amongst other international journals. Therefore I decided to list all articles by Dr. Delacour that have appeared in the *Avicultural Magazine* and I hope this reflects the industry and devotion to the Society possessed by our former President.

As a supplement, I have also decided to list his writings that have appeared in book form, several of which remain standard works on their subjects.

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BOOKS AUTHORED (OR CO-AUTHORED) BY JEAN DELACOUR

- *Recherches Ornithologiques dans la Province de Quangtri et Quelques Autres Regions de L'Indochine Française.* (With P. Jabouille). Archives d'Histoire Naturelle, Paris. 1925.
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- *Les Gallinaces et Pigeons de L'Annam.* (With P. Jabouille). Faune des Colonies Françaises. Paris. 1927.
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- *Curassows and Related Birds*. (With Dean Amadon). American Museum of Natural History. New York, 1973.

(To the best of my knowledge this is complete, but if readers know of any other books authored or co-authored by Jean Delacour, I will be very glad to have details, via the Editor, so that they can be listed in a future issue. Alan Gibbard)

ACKNOWLEDGEMENTS

We are most grateful to the many members who have helped to produce this memorial issue and we would like to thank all the contributors for taking the time and trouble to write such interesting articles. This response is indeed a token of the esteem in which Jean Delacour is held by so many. Our thanks are also due to Miss Ruth Ezra, President, and Mr. Raymond Sawyer, Vice-President, lifelong friends of Jean Delacour, whose idea it was to publish this issue.

We have tried to cover the various aspects of this great man's life but are aware of many omissions. On the other hand, with a compilation such as this, there is inevitable repetition which would have been very difficult to edit out without losing the essence of each article. However, we hope that we have given some idea of his achievements and that younger members in particular, who may not have had the pleasure of meeting Jean Delacour, may be stimulated by this issue to read more of his writings. Many of the issues of the *Avicultural Magazine* containing his articles (listed by Alan Gibbard on page 70) are still available from our extensive stock of back numbers - please send enquiries to the Hon. Secretary. In future issues we hope to publish lists of references to other journals to which Jean Delacour contributed regularly.

We hope that you will enjoy reading this special double issue.

Mary Harvey - Editor

BREEDING THE DESMAREST'S FIG PARROT

By ROSEMARY WISEMAN

(London)

Fig parrots have never been freely available to the aviculturist, and have always been highly sought after. This is undoubtedly because their rarity is coupled with great beauty, but they are also attractive because they pose something of a challenge when kept in captivity.

The problems associated with them seem to take two forms. Firstly, fig parrots do have a habit of dying apparently unaccountably, often revealing some sort of haemorrhage on post mortem. This kind of death in a pair of Salvadori Fig Parrots is reported by Billet (1979). Secondly, fig parrots, although ready to breed seem to be incapable of rearing chicks on what we are able to provide for them. All the accounts of breeding I have read seem to follow a similar pattern of successful hatching, followed by the chicks dying at anything from two days to six weeks later (Anon, 1983). Nevertheless, even taking these drawbacks into account, fig parrots as a group are most charming in appearance and behaviour. They belong to two genera which are anatomically distinct from other parrots according to Holyoak, the source quoted by Foreshaw.

The two genera are *Opopsitta* and *Psittaculirostris*. The Double-eyed Fig Parrot is the representative of the *Opopsitta* group most readily available to aviculturists (and this is far from often). The Double-eyed is about the size of a parrotlet, predominantly leaf green, but with red and blue head and cheek colourings. There are many subspecies showing small variations in colour. The members of the genus *Psittaculirostris* are much larger, being about 18 in long (0.46 m), and built like a chubby lovebird. They are very playful and move like lories, bouncing along the branches to greet each other when excited. There are three species which comprise the genus; these are the Edwards' Fig Parrot *P. edwardsii*, the Salvadori Fig Parrot *P. salvadorii* and the Desmarest's Fig Parrot *P. desmarestii*. Without giving detailed descriptions of each species, it is sufficient to say that Edwards' has a bright red throat and (in the male) red chest feathers, while Salvadori's has yellowy green throat feathers, with a band across the chest which is red in the male and blue in the female, and Desmarest's has bright yellowy orange head and cheek feathers. Both Edwards' and Salvadori's show the typical striated effect on the feathers round the cheeks and throat, but this is much less evident in Desmarest's.

Both groups of fig parrots are found in mainly lowland forest in the Western Papuan Islands and in New Guinea.

P. desmarestii shows small variations in colouring which have led to the identification of a number of subspecies. My own pair are *P.d. occidentalis*, and they lack the blue occiput of the nominate birds. A group of them seem to have been imported in 1981, and I imagine my pair and the ones which were the subject of an article by I.H. Mitchell (1982) came from the same group. Mine came originally from a dealer in Worcester. They had one previous owner who reported that they had roosted in a nest-box, but nothing further had happened.

They were housed in an aviary - part of a block - with a flight measuring 15 x 4 x 6 ft (4.57 x 1.21 x 1.83 m) with access to indoor quarters of 4 x 4 x 6 ft (1.21 x 1.21 x 1.83 m). The aviary was planted with black-currant bushes and, in the summer, weeds. The birds were supplied with five or six twiggy apple branches. These were chewed continually and although replaced whenever possible, the branches were supplemented with the struts of their aviary, and subsequently with the replacement struts. Interestingly, the currant bushes were kept pruned, but never completely destroyed, only the topmost shoots being taken. No nest-box was provided initially, and the birds spent the winter flying outside but roosted in the indoor heated flight. In the spring of 1982 a lovebird nest-box measuring 8 x 8 x 11 in (0.20 x 0.20 x 0.28 m) was hung in the outside flight, and by the early summer they were sleeping in it and showing quite a lot of interest in it during the day.

Their diet consisted of chopped fruit (apple, pear, grapes, banana), mixed parrot seed and two soaked (dried) figs a day. Various kinds of food have been tried and I find fig parrots in general to be quirky and individual feeders. Desmarest's will eat sponge cake, but no vegetable except for a little watercress. Edwards' will take sweetcorn (maize) and some carrot, but no cake. Although seed and fruit were basic foods, I was concerned that they were getting little protein. The usual sources of protein - cheese, egg and meat, bread and milk - were tried and carefully ignored. Animal protein did seem to be necessary since fig parrots eat only the seeds of figs, and the large number of insects which live in the fruit probably form a significant addition to their diet.

In desperation I purchased a hundredweight (51 kg) each of fish meal and meat meal. These hung around the house for months while the atmosphere became less and less distinguishable from that of a 16th century galleon on a transglobal expedition. The birds would touch nothing that had contact with either of these delicacies, and I cannot say that I really blamed them. Mealworms were offered but not taken at this time. Vionate was sprinkled on to the food, as was grated cuttlefish 'bone' and wheat-germ. Vitamin K was provided in the form of one-eighth of a tablet of Synkavit (Roche). This was powdered and sprinkled over the figs twice

weekly. It is said that fig parrots are unable to synthesise Vitamin K, as do most creatures; rather they need to ingest it from the figs which form a major part of their diet. Vitamin K is helpful in promoting blood clotting, and, therefore, in reducing the propensity to haemorrhage which seems to affect all fig parrots. Rosemary Low, writing of her experiences with a Salvadori's hen, makes a strong case for using this to prevent haemorrhage through rupture of the oviduct wall when a bird becomes egg bound, and the breeder of Edwards' Fig Parrot (1983) said that after losing two hens he was able to breed successfully after adding Vitamin K to their diet.

Sexing the birds on sight was nearly impossible. One appeared slightly larger, and definitely more assertive and bossy. I assumed that this was the male or possibly one of the males. I.H. Mitchell (1983) makes interesting observations on the difference between sexes. He says '.....these longer (neck) feathers of the cock overlap more of the blue band bordering the lower neck/upper breast. Hence the blue band on the cock is less broad and therefore less apparent than that of the hen'. When I applied this distinction to my birds it seemed far from clear cut. Subsequently, my observations led me to conclude that in *Psittaculirostris*, the females are generally larger and always dominant. This is also true of the genus *Opopsitta*. Desmarest's cocks are smaller, have less brightly coloured yellow neck and cheek feathers and are much less forceful as personalities. They are also much more delicate.

Towards the middle of the summer of 1982 the birds became very much more active and noisy. One would bounce along the perch to tackle the other by grabbing a leg or the tail, and there was much sportive scuffling and hanging upside down from the roof of the flight with flapping wings. Both birds were now very much attached to the nest-box and spent a lot of time playing around the roof of it and climbing in and out. There seemed to be little serious attempt at sitting, and I was surprised to find one egg when I took down the box to clean it before winter. This egg was creamy white, and measured $1\frac{1}{4}$ in long (0.03 m). It was cold and no sign of fertility was apparent when it was opened. However, at least it was now clear that one of the birds was a hen.

The pair wintered over successfully, coming indoors to roost only on the coldest nights. At that time their nest-box remained outside, but now I hang the boxes inside, partly because it is warmer, and extreme cold is a discomfort to be avoided, and partly because the boxes are easier to inspect. By March they were sitting again; I had calculated that the incubation period was about three weeks.

It was difficult to determine exactly when the egg was laid as the nest-box was so placed that inspection was a major operation involving passing through several other flights. This remoteness, while frustrating, gave the

birds additional security which they appreciated, I think.

During the March sitting the aviaries were 'alarmed' and the continual work and disturbance led to two half-developed embryos which at least gave hope of future chicks. The hen's behaviour when the eggs failed to hatch was sad and striking. She was clearly deeply upset - she kept going in and out of the nest-box and then pursuing the cock round the flight regurgitating and spitting food at him from a distance of about a foot (0.30m). By the following day this had stopped but the birds moped on their perch and were much quieter than previously and obviously depressed. This hen was possibly experienced and knew what should happen, since another Desmarest's hen sat quite happily for over a month and showed no concern when the eggs were removed.

The third lot of eggs was laid on 7th July and were due to hatch just before we went on holiday. When the hen failed to appear at the end of the incubation period it seemed clear that there were chicks or a chick.

As I said at the beginning of this article, the provision of a diet adequate for the rearing of chicks has always been a major problem with these birds. Previously, as I have said, the Desmarest's had been offered mealworms in which they showed little interest. Now, however, during the July brooding, mealworms started to be taken in increasing quantities. The birds would husk them, grinding the flesh out and leaving a dry skin. It was decided to offer as great a variety of food as possible, and so, as well as mealworms, we also provided wax moth larvae, Cow and Gate 'Fruit Delight' baby food, soaked seed, chopped fruit (apple, banana and grape) and the usual soaked, dried fig. The wax moths were very deceptive; an empty container would simply mean that they were snuggling safely under the floor newspaper. As the chick grew, however, the cock became better at grabbing them quickly and when the chick was about 10 days old, we were using about 50 a day, besides the mealworms. Apart from a little fig, live food was the only thing taken.

Suddenly the food intake dropped, and inspection of the box revealed a dead, two-week old chick covered with white down. Post mortem revealed enteritis due, I was sure, to an inadequate diet rather than any direct infection. This saw the end of breeding for 1983. The hen did not repeat her distracted behaviour when the chick died.

Over the winter I was exercised over the problem of diet. An afternoon spent in the library of the Zoological Society of London revealed nothing at all about Desmarest's as they seemed neither to be kept in scientific collections, nor to have been the subject of field study.

I obtained a list of fruit importers from the Indonesian Embassy, in the hope of finding someone who would perhaps import some of the figs identified by Forshaw in his comments on these birds, but this effort

failed. Various notions about using the larvae of tropical ants foundered on the impossibility of finding a supplier. However, two important pieces of additional information partially dispelled the gloom which is the inevitable result of avicultural failure. During the autumn, the anonymous article referred to above was published in the November *Parrot Society Magazine*. In it the author described how he reared Edwards' Fig Parrots by feeding the adults a diet which included figs mixed with Milupa baby food. The second achievement was that of George Smith who succeeded in hand-rearing *Psittaculirostris salvadori*, the first fig parrots ever to be bred and reared in the U.K. Very generously, his then assistant, Judith Nicholas, copied out the diet they had used and sent it to me.

In 1984 mating took place around the second week of March. The birds had been given a new nest-box with a layer of wood shavings in the bottom. They preferred this box as it was slightly deeper and presumably felt more secure. It was hung outside at the highest point of the aviary.

A week before the eggs were due to hatch, the seed was removed and the parents offered chopped fruit as before, plus softened figs mixed with one teaspoon Heinz 'Bone, Beef and Vegetable Broth'. A pinch of bone meal, pinch of Vionate and a two drops of Cytaccon (B12) were added (plus one-eighth tablet Synkavit twice a week). Finally, about 15 to 20 mealworms were stirred into the mixture, so that the parents, who were basically interested in the live food, would have to feed some of the other foods as well. This diet was fed for the first week, after which a mixture of fruit and vegetable Milupa products were gradually substituted for the bottled baby foods. The switch-over took about three days, but proved no problem for the parents who seemed happy to eat anything which had mealworms in or on it. Mr. Smith used equal quantities of fruit and vegetable Milupa, but I found the birds ate more if the mixture was sweeter, and so used more fruit variety. Throughout the rearing, the birds took very little chopped fruit (about $\frac{1}{2}$ to $\frac{3}{4}$ oz [14 to 21g] a day) and concentrated on the fig mixture. When the chicks were about three weeks old a small dish of soaked sunflower seed was provided each morning and removed at night to prevent the consumption of any mouldy seeds, since the weather at this time was warm and humid. The seeds were soaked for 24 hours, and well rinsed before offering. These were taken also in small quantities ($\frac{1}{2}$ oz a day) which gradually increased towards the end of the brooding period. A few grains of sand were occasionally sprinkled on the seed to provide some kind of grit although the parents themselves were never seen to touch grit when it was previously provided.

Food was changed three times a day - once in the morning, again at

about 4.0 p.m. and finally late at night so that it was reasonably fresh for the early morning feed. The nest-box was inspected on 26th March and showed two eggs. The early stages of incubation were conducted in a very relaxed manner, then hen being content to chew branches and generally sit around, until harried back into the box by the cock. These birds are, as Mr. Mitchell states in his article, almost entirely arboreal, but the only time I have seen them on the ground was during the incubation and rearing period when the hen would peck up something (grit? minerals?) from the gravel floor of the flight.

By 6th April I was sure that the egg or eggs had hatched. The hen rarely left the box, and on returning to it would look inside and make a peculiar soft, purring noise before climbing down to the chicks.

An inspection on 9th April revealed two chicks about four days old with long tufts of white down on them.

It was decided to inspect the nest-box once a week, but in order to keep some sort of check on whether rearing was proceeding smoothly, all the food was weighed before and after consumption. In this way it was hoped that any sudden drop in intake could be investigated, and problems corrected before they became irremediable. The weighing was necessary because it was not easy to gauge how much food had been taken, just by looking at the dish.

Just after hatching, food intake was $2\frac{1}{2}$ oz (70 g). In the week before the chicks left the box, the food taken had risen to $6\frac{3}{4}$ oz (189 g). The intake graph showed, as one would hope, a steady rise upward, except for a sharp drop about a week before the chicks were due to fledge. The amount taken had been between $4\frac{1}{2}$ to $5\frac{1}{2}$ oz (126 - 154 g) during the day; however, on 25th May the intake dropped to 3 oz (84 g) and was again down on 27th May. But as the chicks looked alert and healthy, nothing was done. The drop in intake was possibly linked with the weight loss necessary before fledging. This, in fact, occurred on 30th and 31st May.

Inspection on 26th April, when the chicks were just under three weeks old, showed them sprinkled with down, and with their eyes open. At four weeks they had developed pin feathers over the wings, and by six weeks the yellow pin feathers were showing on their heads. Initially the parents had kept the nest-box immaculate but as the chicks started producing larger quantities of mushy faecal material, the shavings became damp and slightly smelly. Armed with two baskets, one for chicks and one with fresh shavings, two newspapers and a plastic flower label for cleaning out corners, I lifted down the box. The chicks backed into the corners but were carefully lifted out, placed in a basket and covered by a newspaper. The nest-box was upended onto the other newspaper, the corners scraped

out as well as possible with the plastic label and the inside dried with a kitchen paper towel. A handful of fresh litter was put in the bottom and the chicks were returned to their nest. The box was hung up in the same position and the parents shooed out into the flight. After a rather anxious five minutes during which the hen flew to the box, peered in, uttered outraged squawks and flew off again, she was eventually persuaded by the cock that nothing was radically wrong and disappeared into the entrance hole. This cleaning process had to be repeated twice a week for the rest of the brooding time and the parents became increasingly phlegmatic about it.

It also gave me a chance to weigh the chicks which at five and a half weeks weighed $2\frac{3}{4}$ oz and 3 oz (77g and 84 g) respectively. By six and a half weeks they had both gained $\frac{1}{4}$ oz (7g). On 30th May the smaller chick was out of the box, a few pin feathers still showing on its head. The second chick was peering out through the nest-box entrance. The first one spent the day being fed by the cock, and was returned by me to the box in the evening. Both parents roosted with the chicks. On 31st May both chicks were out; they were about three-quarters of the size of the adult birds and were identical to them, except for the fact that they lacked the brilliant yellow on the heads and cheeks of the adults. In the babies this was replaced by an apple green colour. The smaller chick showed very pronounced stripes around the throat and cheeks, and this, coupled with the fact that it was much less assertive than the other chick led me to think that it might be a cock, which was, in fact, the case. The father, after the hen had laid again, passed his days playing with the larger chick and even started to feed it in a far from paternal way.

The young birds were removed after six weeks, by which time the second round of eggs was just about due to hatch.

The adult birds never showed any signs of aggression towards the chicks and behaved impeccably throughout the breeding. They kept the box as clean as possible and tolerated my interference good humouredly. The incubation period was 23-24 days; the period from hatching to vacating the nest-box was exactly eight weeks, to the day. Seeing the four birds in the flight together was a marvellous sight.

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BREEDING THE BAR-BREASTED FIRE FINCH

Lagonosticta rufopicta

By RICHARD WALLIS

(Yate, Avon)

This species of fire finch originates from tropical Africa in Senegal, Gambia, Ghana and across a narrow band of central Africa including a northern part of Uganda.

The Bar-breasted is similar in appearance to the commoner Red-billed or Senegal Fire Finch *L. senegalensis* but with a broader tail and slightly larger bill.

The name Bar-breasted derives from the small white spots or marks which give the appearance of very delicate 'bars' across the breast.

The female is very similar to the cock but a slightly duller red.

Three birds were purchased towards the end of 1986; at that time I was unsure of their sexes but they turned out to be two hens and one cock.

The birds were over-wintered in a shed with another species of Fire Finch - the Dark Fire Finch *L. rubricata* which, incidentally, I have bred to five generations. These were all housed in an inside flight cage approximately 2.0 m long x 1.0 m high x 0.5 m deep.

The temperature was kept at approximately 6-8°C during the winter. The food offered during this period consisted of panicum millet, Japanese millet, plate millet, yellow millet, and lettuce. Soaked seed, sprinkled with a mixture of Claus honey insectivorous food and Orlux eggfood was offered two to three times a week. The actual food taken I cannot be too sure of.

In the latter part of April 1987, we moved house, so the birds were housed in cages for two weeks while some aviaries were prepared. The Bar-breasteds were released into an aviary measuring 1.8 x 1.8 x 1.8 m, together with two pairs of Australian finches.

Nesting material was provided in the form of hay, chicken feathers, and coconut fibre. Various nesting receptacles were fixed in the aviary as well as some large conifer branches which were tied up as at that time there were no plants or shrubs growing naturally in the aviary suitable for nesting in.

A nest was built 1.0 m from the ground, using some of the conifer branches for support, and made from the materials supplied. It was dome-shaped with a few feathers lining the nest and one at the entrance as a door.



Richard Wallis

Bar-breasted Fire Finch chick, approximately one week after leaving nest

I knew that eggs had been laid but not when or how many as I left the birds strictly alone. However, it appears that the time from the first egg being laid to the fledging date is 29 days. The diet was changed to include live food such as meadow ants, ants' eggs, greenfly and fruit flies.

Three chicks left the nest on 29th July and had difficulty in flying, spending the first two nights out of the nest, whereas the chicks of the second clutch returned to the nest for the first four to five days after fledging. I feel that this second clutch were stronger because they had had the chance of more live food whilst in the nest.

The chicks were brown in colour and gradually attained the colour of the adults.

A second nest was made in a hay basket, approximately 1-3 m from the ground with feathers as a lining.

Four chicks were reared, but one died on the first day of fledging.

So in all, six birds were successfully reared in 1987 which I shall use for breeding next season having lost the original breeding hen.

As described above, the Bar-breasted Fire Finch *Lagonosticta rufopicta* has been bred by Mr. R. Wallis and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or of any other reason that would disqualify this claim, is asked to inform the Hon. Secretary.

THE COMMON BRONZEWING PIGEON

By DEREK GOODWIN

(Petts Wood, Kent)

The bronzewing pigeons of Australia form a group of ten related species. Or possibly 8, 9 or 12, depending on whether one or two are regarded as full species or merely as races and whether the genus *Hemiphys*, of New Guinea and New Britain, should be included with them.

These pigeons are a beautiful example of adaptive radiation. Their colour patterns, sexual behaviour and distribution all indicate phylogenetic affinity but there are several genera, some of which differ much in shape and proportions from the others, these differences being due to adaptations to different habitats and/or ways of life. They take their name from the iridescent markings on their wings. These are most brilliant and extensive in the Common Bronzewing *Phaps chalcoptera*, and more or less obsolete in the Australian rock pigeons, *Petrophassa*.

In this article I propose to say something about the Common Bronzewing. This is not only the most widely distributed of all the bronzewings, it is also the most beautiful and one of the most frequently kept and bred in captivity outside its native land.

The Common Bronzewing is about the size of a smallish domestic pigeon but with proportionately broader and more rounded body (due to thicker feathering) and smaller head. Its forehead is creamy buff to reddish buff, bordered at the back with purple which extends along each side of the head behind the eye. There is a dark stripe from bill to eye and a white or cream stripe under it that runs along the side of the head. The sides of the neck are bluish grey, the throat whitish and the breast a beautiful rich mauvish pink, shading to pale rufous to pale buff edges to most feathers, giving a laced or mottled effect. The wing coverts, or most of them, are partly bluish grey, with large iridescent spots or patches which appear emerald green, bronzy red or dark golden but similar iridescent markings on the secondaries appear purplish red and bluish green. These iridescent markings form bars across the folded wings in the living birds, very different from the jumble of spots they sometimes appear in museum skins or in the works of bird artists who have drawn only from such skins. As with many pigeons that have conspicuous display plumage on the wings, these glossy areas are not visible from directly above when the bird is not displaying them. The underwing coverts and axillaries are light chestnut. The outer tail feathers are bluish grey with dark terminal bands, the central pair brown. The iris is dark brown or reddish brown with a narrow

fleshy grey orbital skin; the bill purplish black and the feet and legs purplish pink.

The hen has a greyish forehead, little or no purple on the head and a buffish drab breast at best merely tinged with pink. In many but not all hens the glossy wing markings, though as brilliant as the cock's, never look red or golden in any light.

The young are duller with at first no iridescence on the wing and both sexes (*fide* Nicolai) have buff foreheads until the first moult.

In the field, or rather in the bush, this bird's plumage is very concealing but, if one knows what one is looking for, the white facial streaks sometimes give a pair away as they stand quietly in the shade of some bush, ready to fly if the observer gets too near. At such times the (otherwise) shining wing markings often look a dark and glossless olive green. As does the brilliant green wing patch of our Teal *Anas crecca*, when seen in deep shade or under an overcast sky.

When seen in flight from above the bird looks a general darkish brown, unless the iridescent areas catch the light which, strangely, they seldom seem to do. When the bird is passing more or less at eye level or above, yet not silhouetted against the light, the warm chestnut underwing is conspicuous like the, respectively, reddish and golden underwing coverts of our Redwing *Turdus iliacus* and Song Thrush *T. philomelos*.

The Common Bronzewing is found over most of Australia and Tasmania being, in general, absent only from the wettest and densest woodlands and from built up areas. There are good photographs of the habitats of this and other species in Frith's fine book on Australian pigeons. This species gives the impression of being, as Frith claims that it is, the most generalised species of its group and the one most close to the (presumed) common ancestor of the bronzewing group. Another possibility, which would go far to explain its drinking habits, and which I suggested in my pigeon book (p. 152/3) is that the Common Bronzewing evolved in the interior of Australia during a period of considerable aridity when it (or its ancestors) suffered intense predation from birds of prey when coming to sources of water. Nowadays the Common Bronzewing is found in various types of woodland (most types of Australian woodland being rather open by European standards), dry scrubland, open country with shrubs or trees and partly cultivated areas.

It feeds and spends much time on the ground. Seeds of many kinds are taken, including cultivated grains, especially wheat, when available. In the dry interior the seeds of mulga trees *Acacia* spp. often figure largely in its diet. Newman (1929) who bred this species very successfully in the 'golden days' of aviculture prior to the First World War, wrote: 'They do well on the usual larger grains and seeds supplied to pigeons, and are fond

of cut-up peanuts, and will eat some of the soft fruits, such as the wine-berry'. I do not, I am afraid, know what a wine-berry is. A more modern breeder of wild pigeons (Nicolai, 1969) says that a more varied and complicated diet is necessary and should include white millet, canary seed, dari, wheat, hemp and maw seed, all of which must be given in separate dishes, also a 'woodbird mixture' (Waldvogel Mischfutter), greenfood, berries, and eggfood when breeding. When feeding young he says the latter are very prone to rickets so the adults must be given sprouted millet treated with cod liver oil and the young must be given in addition, by hand a gelatine capsule of cod liver oil (presumably daily).

Having no experience of keeping this bird I will merely add that I would do as I have successfully done in the past with other pigeons and scatter the dry seed given to them on and among sawdust, leafmould or other such substrate in a fairly clean part of the aviary, thus giving the birds some interest and exercise when feeding. I hope that members who currently keep this and/or allied species will give us their experiences and advice.

The Common Bronzewing usually drinks in the late evening, just after sunset, some individuals not doing so until it is nearly dark. Like most pigeons they tend to feed most intensively in the late afternoon and to go to drink with full crops. They fly fast and low from their living areas and may fly straight to the drinking place or alight and wait at a distance before making a second flight towards the water but commonly they first alight about 100 or 200 yards (91 to 182m) from the drinking place, wait there for some time, perhaps until a number have gathered together and then walk to the drinking place. When in Australia I was able several times to watch Bronzewings coming to drink at a cattle trough in the dry interior. To quote what I wrote elsewhere (Goodwin, 1978): 'It was nearly dark and, straining my eyes, I could suddenly seepigeons, dozens upon dozens of them, not line abreast but in little hesitant groups, walking over the ground and converging towards the trough. I think they did not see well in the very dim light, for they walked with their heads not nodding to and fro but held straight forward, as a Domestic Pigeon does when it is forced to walk in darkness. They were nervous and alert; each bird would take a dozen or so paces then stop. Each time one stopped its nervousness affected others, which stopped also, each time one moved forwards others were encouraged to follow.....each bird flew up to the troughdrank deeply. The moment its thirst was quenched it flew swiftly and noisily away.

'Few things in bird life have more impressed me than the Bronzewing Pigeon's slow, cautious, hesitating walk the last few hundred yards to water and its impetuous flight away from the drinking place the moment it

had assuaged its thirst. I do not think it is being anthropomorphic to believe that a Bronzewing Pigeon coming to drink *is* as apprehensive as it appears to be and that it must experience great relief as it flies back to the relative safety of its distant home in the scrub.'

The Common Bronzewing builds the usual pigeon nest of twigs, stems, etc., on some horizontal or near horizontal support in a tree or shrub, sometimes in a hollow of a tree or rock or on a rock ledge or on the ground. Frith states that the main breeding season is from November to February but nesting has been recorded at all times of year. The clutch consists of two white eggs, as in many pigeons.

The bowing display of this bird is similar to that of most bronzewings, the wings are partly spread and tilted forwards to show the iridescent markings and the tail is raised. There is a complicated and seemingly very spectacular mating ceremony which was long ago described in detail (Whitman, 1919) but which I have never had the fortune to see.

The advertising coo is a deep, low-pitched *oom-oom* suggestive of the lowing of cattle. There are several other cooing and clucking calls (Frith, Goodwin 1983, Whitman).

There is a beautiful and accurate coloured plate of a pair of these birds by H. Goodchild in the *Avicultural Magazine* for January 1929 and pictures and photographs of the birds and their habitats in Frith's book.

Though the Common Bronzewing appears (Frith) to have adapted well to the present degree of human impact upon Australia, this is no cause for complacency among aviculturists, the more so as the species cannot be legally exported. It is to be hoped that all aviculturists in a position to do so will endeavour to perpetuate and disseminate it. And, I would add, fight against any endeavour by the show fanciers to distort its appearance and ruin its beauty as they have done so devastatingly with another lovely Australian species, the Budgerigar.

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P.S. My little sketches are merely to give some impression of the bird. They have no pretension to art or detailed accuracy. D.G.

HAND-REARING THE SCARLET IBIS

Eudocimus ruber

By RICHARD HUGHES and ANDREW OWEN

(Padstow Bird Gardens, Cornwall)

The Scarlet Ibis is approximately 21-27 in (0.53-0.69 m) in length, the males being slightly larger. The general plumage colour is bright scarlet but this tends to fade to a paler red in captivity. The primaries are black, legs and facial skin red, eyes dark and bill horn coloured (black in the breeding season).

It is found in the mangrove swamps, estuaries and mud flats on the north-east coast of South America and Trinidad. It feeds on fish, frogs, crabs and other crustaceans which it probes for in the mud with its long bill.

Housing and feeding

Five individuals are housed in a large flight measuring 40 x 20 x 20 ft (12.19 x 6.09 x 6.09 m) together with a pair of Violet Plantain-eaters, Red-headed Laughing Thrushes and Black-winged Stilts. Our group consists of one breeding pair, an old male and a second pair which have become established this year (1986), the female of which was hand-reared here in 1983. This article supplements the information given by Kevin Evans on that achievement (*Avicultural Magazine*, Vol. 89, 4:215-217).

The flight is attractively planted with *Leycesteria formosa*, various conifers and a large forsythia bush (approximately 15 ft - 4.57 m) which forms the main nesting site for the Ibis. Two concrete ponds are situated in the flight in which the Ibis regularly bathe and wash their food.

They are fed on a diet of chopped, day-old chicks, Flamingo Pellets, ox heart and live food. They also probe in the soil for earthworms and occasionally catch the odd frog or Slow Worm during the summer months.

Breeding

The breeding season usually commences in mid-spring (depending on the weather) with the breeding birds pairing up and spending a lot of time together, away from the rest of the group. When in breeding condition the colour of the beak changes from pinkish horn to black and the overall plumage becomes a brighter red. Prior to nest-building the male can be seen collecting and carrying twigs and other vegetation. These are sometimes carried to the female and copulation soon follows, often on and around the prospective nest-site. This is observed regularly from about a

week before nest-building commences.

If the weather is mild, large amounts of twigs are placed in the aviary. The male selects a beakful of suitably sized twigs and then carries them to the waiting female which constructs the nest. The comparatively small nest (approximately 12 in in diameter - 0.30 m) is completed within about three days. This is lined with clumps of grass and green leafy twigs. We have found that the Ibis prefer to build their own nest in the forsythia as opposed to using the artificial nesting sites, baskets, etc.

The clutch of 2-3 eggs is normally laid within a couple of days after completion of the nest. The eggs, which are laid every 48 hours, vary in colour from pale sky blue with slight brown speckles to dull grey-green with heavy brown blotches.

The first egg of the clutch of three was laid on 30th April 1986. The female carries out the majority of the incubation, which begins from the laying of the first egg, whilst the male remains close at hand. Occasionally the male carries up food for the female and fresh greenery to reline the nest.

Over the previous two seasons, chicks have hatched only to be thrown out of the nest shortly afterwards. It was therefore decided to remove the first clutch of eggs for hand-rearing. These were taken at the 18th day of incubation.

Artificial incubation and hand-rearing

The eggs were placed in a small Curfew incubator at a temperature of 100°F at a regular humidity of about 60%. They were turned 180° three times daily up until 21st May when one egg began pipping. The egg hatched the following day after an incubation period of 23 days. The remaining two eggs proved to be infertile.

On hatching the chick's eyes were closed and it was covered in thick, black down; its legs and feet were pink with black toenails. The short, straight beak was pink, tipped with black with a white egg tooth. Tiny black hooks were noticed on each alula.

Its diet consisted of the following:

15 shelled snails

A handful of mealworms

One tablespoonful of Liver Kit-E-Kat and Fish Catkins cat foods

Two crushed calcium lactate tablets

A sprinkling of Vionate

Two tablespoonfuls of water

All this was liquidised and pushed through a fine sieve to remove any fragments of shell. It was then stored in a refrigerator and small quantities

were removed and warmed for feeding.

The first feed was given at 10.30 p.m. - ten hours after hatching - when 1½ ml was fed through a small syringe with soft rubber tubing attached. This was given at hourly intervals for the first day. The chick was fed throughout the night for the first week, the length of time between feeds gradually being increased.

Day to day record of development

Day 2: Eyes partially open and is making a shrill squeak whilst being fed. 3 mls is now being fed every two hours.

Day 3: Shuffling around on haunches. Attempting to preen chest.

Day 4: Legs beginning to turn grey whilst feet remain pink. Pin feathers starting to appear under the skin on the wings. Black 'smudge' ring around base of beak.

Day 5: 'Smudge' mark is getting wider. Eyes opening more whilst feeding. Pin feathers erupting on wings and beginning to show beneath the skin on the back. Feet beginning to turn grey. Preening back and chest. Now capable of supporting its head for short periods of time (10 seconds). Faint beginnings of another ring appearing on lower mandible about half-way along the beak.

Day 6: Pin feathers protruding on wings, back and shoulders. Seen pecking at objects for the first time (e.g. kitchen roll). Preening more often. 8ml of food being given every two hours. Missed out at 3.00 a.m.

Day 7: Growing rapidly, legs and feet are now black. Now able to sit up for longer periods. Very inquisitive, often seen looking around, stretching and pecking at thermometer.

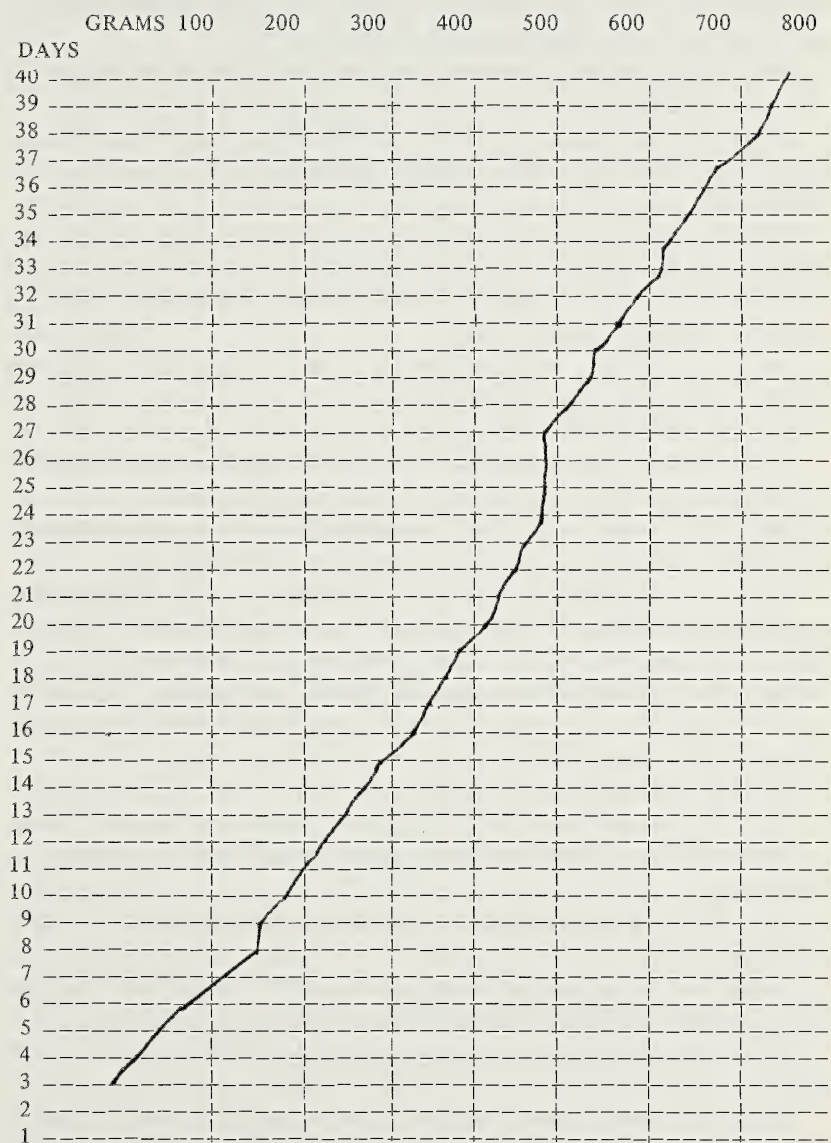
Day 8: Standing up, stretching wings and preening underside. Moved him to a larger tray as he is growing so quickly. This is lined with twigs to enable him to grip and exercise his feet. 14 ml being given every 2½ hours.

Day 9: Black band across bill becoming more pronounced. Feet are noticeably larger, often pecking at feet. Calls whenever he sees us. Bare skin around the eyes is darker grey. 20-25 ml being fed every three hours. Food is now mixed slightly thicker.

Day 10: Beak longer and slightly downcurved. Pin feathers erupting all over body. Swallowed the rubber tubing which was attached to the syringe at 9.00 a.m. No ill effects noticed. Hopefully it will pass straight through.

Day 11: Tubing passed through whilst being weighed at 6.00 a.m. Pin feather emerging on the front of his neck. Screams incessantly when hungry.

Day 12: Black rings beginning to merge at the base of the beak.

GROWTH RATE OF SCARLET IBIS CHICK
REARED AT PADSTOW BIRD GARDENS

Feather quills on belly and rump are pale grey.

Day 13: Vanes emerging from tips of quills. Egg tooth is still visible. Raised the lid of the incubator (a) to give more height for him to stretch, and (b) to lower the temperature.

Day 14: Feathers on rump and underside white or pale grey, all others are black.

Day 15: Standing up a lot now. Clambering around the incubator. 30-35 mls now being taken. Food being mixed into a thicker, creamy consistency.

Day 16: Bill much longer. Moved out of the incubator during the day as he is now too big. Put in a cardboard box with a very low perch and his nest tray with the twigs for its feet to grip on. Put back into the incubator at night. Egg tooth gone.

Day 19: Calling loudly and shaking his wings vigorously when being fed, also makes a strange honking noise.

Day 20: Exercising his wings a lot.

Day 21: Given one or two baby (pink) mice with each feed of 40 ml. Now able to climb on to the top edge of the cardboard box.

Day 22: Eating crickets and mealworms, picks up baby mice and pieces of ox heart but he only shakes these about and drops them.

Day 25: Black tail feathers showing through a white rump. Given last syringe feed today. Now being hand fed on ox heart, pieces of skinned chick, flamingo pellets and pink mice. Still only picking up live food.

Day 29: Tail feathers growing well. Beak growing longer, more down curved. Constantly screaming for food. Being fed slightly less often to encourage it to feed itself.

Dat 30: Given its first unskinned chick.

Day 32: Brought up his first pellet.

Day 38: Pin feathers showing on head, baby down gradually disappearing.

Day 39: Perching on one leg when resting. Still only picking up live food.

Day 42: Put out into shed as he is now able to fly. Did not feed all day, brought in at night and immediately started begging for food.

Day 43: Picking up live food whilst in shed so he was left out all night.

Day 44: Alright this morning. Began picking at inanimate food. Watched him from outside the shed. Seems as though he is totally weaned.

At the time of submitting this article (September 1987), the young Ibis is almost in full adult plumage and is now living in the flight with the adult birds, where he has been since last summer.

REVIEWS

THE PARROTS OF LUQUILLO

Published by Western Foundation of Vertebrate Zoology (1100 Glendon Avenue, Los Angeles, California 90024) at 29.50 US dollars.

Possibly the most intensively studied parrot in the wild is the highly endangered Puerto Rican Parrot *Amazona vittata*. Three of the biologists who have worked with this species during the past 16 years or so, Noel Snyder, James Wiley and Cameron Kepler, joined forces to produce *The Parrots of Luquillo: Natural History and Conservation of the Puerto Rican Parrot*.

Nearly 400 pages of small type (double column) provide an absorbing insight into this species. Its decline and conservation have been followed for two decades by those who are passionately interested in parrot conservation. Now much, but not all, of this fascinating story is unfolded.

The historical decline is vividly documented in the second chapter. One can only speculate on the former size of the population of *vittata*; it may have exceeded one million. Today there are 34 known in the wild (September count - 41 in June). Only four breeding pairs survive.

The third chapter is also of historical interest, describing what is known of the extinct parrots of the West Indies and speculating on the origins of the Puerto Rican Parrot. The conclusion reached is that *agilis* or *ventralis* were involved in its ancestry.

The following chapter describes the Luquillo forest, to which *vittata* is confined today, the species' movements and food, its nest sites, reproductive biology and natural enemies.

Chapters 9 to 11 discuss its recent decline, conservation efforts and the captive breeding programme. The last two chapters are not covered in the detail of those preceding them; much available information was not included. It was necessary, because of the immense volume of data analysed, to use field data up to 1979 only. Subsequent breeding seasons are covered in Chapter 12, Epilogue and view to the future. Almost 100 pages of appendices provide information on a wide variety of aspects, from measurements of Greater Antillean Amazon Parrots to foods eaten by *vittata* in the Luquillo forest.

This book is an often depressing account of a parrot whose decline has been halted - but not reversed. Most readers would believe that *vittata* was doomed to extinction.

Since the publication of this book, however, there have been encouraging developments regarding the personnel who oversee the conservation pro-

gramme. They are now making plans for a second captive breeding programme which will almost certainly ensure the survival of the species.

R.L.

THE QUAILS, PARTRIDGE AND FRANCOLINS OF THE WORLD

By Paul A. Johnsgard. 1988. Oxford University Press. 260 pp. Price £49.

Although only a proof copy, with all its inherent faults, was forwarded by the publishers for review, the old adage 'Never judge a book by its cover' has never been more applicable. Two green covered, spiral bound volumes and a heap of colour plates lay before me with a note stating production of proofs was undertaken on a photocopying machine and does not represent finished printing, quality or dimensions. Needless to say, the finished product will be comparable with the high standards set by previous Johnsgard/O.U.P. volumes.

But what of the most important aspect of any book - content quality? Without doubt this volume will become the standard reference source on these three groups for a good many years to come. A total of one hundred and thirty-four species are covered in the main body of text, each being broken down into a number of separate categories including subspecies, distribution, measurements, identification, general biology and ecology, social behaviour, reproductive biology, evolutionary relationships and status and conservation outlook. Introductory chapters cover aspects of comparative biology which, because of species diversity, has to be kept to within limitations. The whole is interspersed with tables, maps and line drawings.

A feature that we now come to expect from monographic coverage is the illustration, in colour, of all species represented in the text. This book is no exception and for the first time one is able to view every species of quail, partridge and francolin. The bulk of the plates were painted by Major Henry Jones and made available through the Zoological Society of London's Library. Outstanding species were covered by Timothy Greenwood and Mark Marcus, painted specifically to make the coverage complete.

Reading through some of the species accounts, missing data must surely be available through aviculture. For example, no incubation period is given for Erckel's Francolin, a species frequently kept and bred in captivity - whether this is a lapse by the author in his research or the apathetic approach aviculturists have for recording data, it has still to be recorded. Likewise, a description of the type of nest used by the Javan

Hill Partridge is lacking; several built in captivity have been of the domed type, even though pens have been devoid of low, dense vegetation. All workers, be they naturalists, conservationists or aviculturists, now have a summary of what is known about these interesting groups within the galliformes and should make every effort to record relevant date when it becomes known.

Overall, this is an excellent book and one that is highly recommended.

D.C.

KEEPING AND BREEDING COCKATIELS - A COMPLETE GUIDE

By Freddie and Dulcie Cooke. Published by Blandford Press (Cassell), London. Price £15.95 (hard cover). ISBN 0 7137 1961 3. 160 pp.

Dulcie and Freddie Cooke are very well known to British members as great supporters of the Avicultural Society and I cannot remember a meeting of the Society which they did not attend - always interested and appreciative. For some years Dulcie Cooke has contributed excellent articles in *Cage and Aviary Birds* on cockatiels and is now writing about other psittacine species. She recently wrote about hand-rearing an Umbrella Cockatoo in our magazine.

The Cookes have distilled their lifelong experience with Cockatiels into this excellent book which really does tell readers all they need to know about keeping and breeding these attractive birds. It contains a wealth of information and the practical advice is written in a very clear and informative style, illustrated with line drawings, and there is a set of excellent colour photographs by Dennis Avon.

The book provides details of the cockatiel's wild origins, colour mutations, general management, housing, training and breeding with genetic details and cross-breeding charts never previously published in book form. Special chapters cover topics such as incubation, hand-rearing, feeding and nutrition, hygiene. Veterinary surgeon Alan Jones contributes a special chapter on cockatiel diseases and their prevention.

A useful appendix acquaints the reader with tips on show standards (worldwide) and also literature and addresses of useful organisations.

In all, this book is a most valuable guide, highly recommended, and beautifully produced at a very reasonable price.

INTERNATIONAL ZOO YEARBOOK. VOLUME 26 (1986)

Edited by P.J.S. Olney. Published by the Zoological Society of London. 582 pp. Numerous photographs, drawings, maps. Price £39.75 hardback,

£35.50 softback. ISSN 0074-9664.

The special subject in Section I of this volume is Aquatic Exhibits, last covered in the Yearbook in 1964 since when there has been great development in aquatic management and in the ingenuity of aquatic exhibits, in zoos and public aquaria. The exhibits described in Volume 26 extend over an enormous range of aquarium design and construction. At one end of the spectrum are the massive and beautiful coral reef tanks, and at the other end are the small but effective specialised aquaria. The range of animal types covered is also great, with living corals at one end and pinnipeds at the other. In between are quite a number of papers on penguin and seabird facilities, with the Penguinarium at San Diego Zoo being the most impressive. There Emperor and King Penguins are maintained in a magnificent environment to which masses of snow is added daily, and both species have been successfully bred.

Section 2 presents papers on the breeding and management of a considerable number of rare and interesting species, including the Cassowary, Pesquet's Parrot and Humboldt Penguin. There is a very interesting article on breeding the African Pygmy Goose in the Hong Kong Zoological and Botanic Gardens written by Dr. K.C. Searle, Vice President of the Avicultural Society. Section 3 consists of an updated list of zoos and aquaria with an index of zoo names, lists of vertebrates bred in captivity during 1984 and a census of rare animals.

Some Recent Books on Natural History Illustration

Many members who collect paintings and books about natural history may be interested in the following titles, mostly about birds but some of them also include botanical illustrations:

TO SAIL BEYOND THE SUNSET

By C.M. Finney. Published by Rigby International. £25.

An account of the development of the study of natural history in Australia from 1699 to 1829. Includes extracts from contemporary logs, journals and letters and the text is accompanied by a magnificent collection of over one hundred illustrations, both colour and black and white, including reproductions of works by such notable early natural history draughtsmen as Bauer, Westall and Brown. A beautiful book which would make a most acceptable present. It is also remarkably good value.

GAMEBIRDS AND WATERFOWL OF SOUTHERN AFRICA

Published by Winchester Press, Johannesburg. Available from Messrs Wheldon and Wesley (see below). Price £45. ISBN 0 620 09523 7.

A collection of 68 watercolours by C.G. Finch-Davies, originally commissioned to illustrate Lt. Col. Boyd Robert Horsbrugh's book, published in 1912, which was widely acclaimed and brought Finch-Davies recognition as an outstanding bird artist. As well, there is a foreword by Patrick Horsbrugh (nephew), a biography of Claude Gibney Finch-Davies by Dr. Alan Kemp and a biography of Boyd Robert Horsbrugh by F.C. Barnicoat (well-known to readers as a regular contributor to the *Avicultural Magazine* and a Vice President of this Society). The text accompanying each plate has been compiled by Dr. Alan Kemp.

This edition, attractively produced with slipcase, is limited to 5000 numbered books.

TWENTIETH CENTURY WILDLIFE ARTISTS

By Nicholas Hammond. Published by Croom Helm. ISBN 0-7099-1266-8. Price £30.

Though not an exhaustive reference book, the 43 artists selected are generally recognised as amongst the best in this field.

A biography is given of each, illustrated with several coloured plates. There is a general introduction to the subject and an extremely valuable bibliography.

DRAWING BIRDS

By John Busby. Published by the Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire, SG19 2DL. Distributed by Croom Helm. ISBN 0-903138 21-2. Price £12.95.

A very practical guide to starting out in this most difficult and exacting field. Illustrated by coloured plates and numerous drawings by well-known artists as well as demonstrations by the author.

MR MARSHAL'S FLOWER ALBUM

Published by Victor Gollancz ISBN 0-575-03536-6.

Over 120 beautiful colour plates from the album of plants painted by Alexander Marshal in the mid-seventeenth century, which has been in the Royal Library at Windsor Castle since the reign of George IVth. John

Fisher provides the Introduction and detailed captions to each plate. A lovely book that would make a most welcome present.

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Probably the best source of books in Britain, on all branches of natural history, is the very long established company of Wheldon & Wesley, Lytton Lodge, Codicote, Hitchin, Hertfordshire SG4 8TE (Telephone Stevenage - 0438 - 820370). The company publishes a very large and comprehensive catalogue of books in stock on every branch of natural history, mainly secondhand, but they will also obtain new books from publishers in most countries of the world.

Wheldon and Wesley also act as agents for publications by the British Museum (Natural History) and the Hunt Institute for Botanical Documentation, Carnegie-Mellon University, Pittsburgh, USA. I have many of the Hunt Institute's publications and for readers who are interested in botanical illustration, I can particularly recommend *FLORA PORTRAYED*, by J.V. Brindle and J.J. White, price £18, which contains plates of many classics of botanical art from the Hunt Institute's collection; also the very well-illustrated catalogues of the International Exhibitions of Botanical Art and Illustration which are held regularly at the Institute.

The Chairman of Messrs. Wheldon and Wesley is Howard Swann who is a great supporter of the Avicultural Society and members will recall his excellent translations of French articles in the *Avicultural Magazine*. He is always happy to help members locate natural history books, either new or old; also to offer best prices for books they may wish to sell.

M.H.

NEWS AND VIEWS

Bernard Sayers writes from Chelmsford, Essex, about the 1987 breeding season:

'In spite of the miserable weather this year, the owls here bred tolerably well. The following were all successfully reared by their parents:-

3 Turkmenian Eagle Owls	<i>Bubo bubo turcomanus</i>
3 Savigny's Eagle Owls	<i>B.b. ascalaphus</i>
3 Bengal Eagle Owls	<i>B.b. bengalensis</i>
2 Magellan Eagle Owls	<i>B. virginianus nacurutu</i>
2 Brazilian Rusty-barred Owls	<i>Strix hylophila</i>
4 Tawny Owls - grey phase	<i>Strix aluco sylvatica</i>
6 Boobook Owls	<i>Ninox novaeseelandiae</i>
11 Collared Scops Owls	<i>Otus bakkamoena</i>

'At the moment (December 1987) my pair of Bengal Eagle Owls have small chick(s) and the old pair of Brazilian Rusty-barred Owls are incubating eggs.

'This year I have made considerable efforts to exchange home-bred owls with several foreign collections, public and private, and although I could write several volumes on the problems I have encountered, some success has been achieved. In this way some of the species which had become very inbred have been strengthened by an introduction of new blood and several new species have been added to British aviculture. So far the following importations have been arranged by some of my friends and me.

'From Antwerp Zoo we received three Turkmenian Eagle Owls and two African Spotted Eagle Owls *Bubo africanus africanus*.

'I have sent four Boobook Owls, two Collared Scops Owls and two Mackinder's Eagle Owls *Bubo capensis mackinderi* to Tierpark Berlin. In exchange I received two Milky Eagle Owls *Bubo lacteus*, two African Spotted Eagle Owls and two Ferruginous Pygmy Owls *Glaucidium brasilianum*.

'A friend and I shared a shipment from Winnipeg Zoo. This consisted of four Great Horned Owls *Bubo virginianus virginianus*, one Great Grey Owl *Strix nebulosa* and one Barred Owl *Strix varia*. Previously we had sent to Winnipeg three Turkmenian Eagle Owls and two Great Eagle Owls *Bubo b. bubo*.

'It has been arranged to obtain the following by exchange and these will be imported when quarantine can be arranged:-

6 Savigny's Eagle Owls	<i>Bubo bubo ascalaphus</i>
4 Syrian Little Owls	<i>Athene noctua lilith</i>
6 Striped Owls	<i>Rhinoptynx clamator</i>
5 Common Scops Owls	<i>Otus scops</i>

10 African Spotted Eagle Owls

Bubo africanus africanus

6 African Barn Owls

Tyto alba affinis

'All birds are captive-bred in reputable zoos.'

We wish Bernard Sayers even greater success in the 1988 breeding season.

* * *

A new member, Mr. James Hawk, of Elsinore, California, would like to correspond with any other members on the subject of raptor care and rehabilitation. He is very interested in birds of prey and would appreciate any and all assistance any member can offer. Please write c/o the Editor.

* * *

From David Coles:

The Plains Wanderer *Pedionomus torquatus* has appeared in these pages on several occasions. Believed at one stage to be one of Australia's rarest birds, research in the last three years has proved that it is far more numerous than previously thought. In a 60,000 hectare study area, over 400 birds were leg banded.

An interesting article by Tim Inskipp in *Traffic* (Vol. 9 no. 1) on Hummingbird trade and protection contains a wealth of interest on a variety of aspects of this large family. A breakdown of known consignments into several European countries is given, while at the end a list of all species is given with a summary of their status in the countries in which they occur.

The Helmeted Woodpecker *Dryocopus galeatus*, the rarest of South American woodpeckers, has been reliably sighted for the first time in decades. Researcher Edwin Willis observed a female in western Sao Paulo, Brazil; other unconfirmed reports come from eastern Paraguay.

Observers of the autumn 1986 migration at Beidaihe Hebe province, China, counted a grand total of 2,729 Oriental Storks *Ciconia boyciana* between 11th October and 16th November; this represents more than twice the previous world population estimates.

Another stork to show some promise is the Storm's Woolly-necked Stork *Ciconia episcopus stormi* which has just been found nesting in Thailand. Not only a new bird for the country, but it represents a major range extension northwards for this threatened species. The nest contained two young.

The status and conservation needs of the Bali Starling *Leucopsar*

rothschildi is the subject of an article in issue No. 5 of the Oriental Bird Clubs' Bulletin. The wild population of the species, possibly in two isolated areas on the island of Bali, is given at between 125-180 individuals with a further 1000 birds held in captivity worldwide. Amongst suggestions put forward to aid conservation is a reintroduction programme using American captive-bred birds, which in some instances are now being bred to fifth generation.

* * *

Alan Gibbard, who regularly contributes articles on the history of aviculture to this Magazine, is particularly interested in writing articles on the lives and work of the great avicultural collectors such as Wilfred Frost Cecil S. Webb, Fred Shaw-Mayer, etc. His article on Walter Goodfellow (Vol. 92, No. 4, page 220) has resulted in several letters with personal recollections from members and we believe, therefore, that readers would be interested to read more about the earlier days of aviculture. Alan would be most grateful to hear from any readers who have information regarding the great collectors, either details of their lives, personal reminiscences, photographs, catalogues of species they collected, newspaper cuttings letters or any other relevant details. Please write to him c/o the Editor.

* * *

Dieter Schmidl has written from the Max-Planck-Institut, Seewiesen, Germany, about a female Forest Weaver *Ploceus bicolor sclateri* (Roberts) which was hand-reared from the second day after hatching to sexual maturity.

'This afforded the first description of all aspects of this species' early development (nestling and juvenile plumage, juvenile moult), behaviour (social, foraging, comfort and breeding) and song and duet development. In order to distinguish innate from learned song, the human foster parent constantly whistled a folk song to the young bird and observed the result. The song was copied, which indicated learning, as has been recorded in the song-whistling Bullfinch *Pyrrhula pyrrhula*. A close bond between young and parents or substitute-parent is necessary for such learning, denoting imprinting. Learned song elements are presented.

'Song development is remarkably slow. Increased synchronisation with playback of a recorded song on a tape loop indicates that adjustment to the partner is attempted in duetting. Singing in unison does not seem to have family-bonding function.

'There is no evidence for the suggested advantages of mating between

siblings in terms of reduced costs of learning. Duet development in relation to partner choice still needs clarification.'

* * *

From Derek Goodwin (inspired by the Song of Solomon)

DOVE IN THE ROCK

The traffic thunders overhead
Along the modern motorway.
Beneath, on steel and concrete ledge,
The Pigeon preens his feathers grey.

Then swells his rainbow-lustred neck
And firmly coos: 'This site is mine!'
As did his forebears, ages past,
Beneath the stairs in Palestine.

* * *

CORRESPONDENCE

Keeping and breeding full-winged ducks in aviaries

The following observations may be of interest since the fertility, in my experience, is so much higher.

In Mitchell Park Gardens we have several large aviaries planted fairly thickly with subtropical plants.

Several species of duck, especially the perching kind such as Rajah Shelduck *Tadorna rajah*, Hartlaub's Duck *Cairina hartlaubi*, Ringed Teal *Callonetta leucophrys*, Chestnut-breasted Teal *Anas castanea*, Mandarin Ducks *Aix galericulata*, Carolina Wood Duck *A. sponsa* are highly suitable for display in this kind of environment if left full-winged and not pinioned. They are far more active exhibits and are prolific breeders if kept in groups and free-flying.

The rare and beautiful Hartlaub's Duck which I have not yet succeeded in breeding, spend a lot of time flying from perch to perch, but can become very aggressive in spring. Our pair would not tolerate rails or moorhens or even pheasants in the aviary and on one occasion a full-winged Ringed Teal that found its way in through a hole in the neighbouring aviary was hunted down by the Hartlaub drake and killed. If any reader knows where I can obtain more of this species, I would very much like to hear from them for these ducks would do very well in this climate of Durban and we have just lost our one female so are now down to one male.

The Ringed Teal have been very prolific, hatching broods of up to 15 ducklings which they rear themselves. Mandarin ducks have even hatched up to 23 ducklings in one go and 17 ducklings in one hatch is quite common.

This year, from one Moluccan Rajah Shelduck (1987/1988 - your winter, our summer), which laid four clutches of eggs we have reared 30 healthy ducklings. The original drake died after the first clutch of nine eggs was laid so we replaced him with another, unrelated, adult drake, at the same time as removing the eggs and placing them under a Pekin Bantam hen - whereupon within a week the duck went to nest again and laid eight more fertile eggs. The fact that they paired up so quickly, both having previously had pair bonds, amazed me and we reared another eight ducklings. We took the eggs away after the duck had sat on them for 10 days or so because the Occipital Blue Magpies in the aviary would kill the newly hatched ducklings, as they had done on a previous occasion, but they do not seem to bother about the eggs in the duck box.

Of the third clutch of eggs only five ducklings hatched and were reared, and out of a fourth clutch eight ducklings hatched out of eight eggs and all

were reared, making 30 ducklings reared altogether.

All the perching ducks like nesting up high in the holes of trees and cliffs so duck nesting boxes or logs placed high under the roof suit them perfectly.

Perching ducks, being woodland and forest dwellers, are agile and manoeuvrable in flight and very adaptable to the confined conditions of a planted aviary. I have tried non-perching species of duck and found Hottentot Teal quite at home flying in a confined space. Hawaiian Geese also are quite at home on rockeries but they are such terrible browsers of plants in preference to grass that I had to end that experiment. In contrast to the prolificacy of this one Moluccan Rajah Shelduck, mentioned above, the other pairs of pinioned Rajah Shelduck did not even go to nest last year and they have nest-boxes placed a few feet off the ground and tunnels to explore, but we have found them spasmodic breeders in comparison to the full-winged birds. All the shelduck bred here in the Park are of the same blood line.

Mitchell Park Aviaries
Durban, South Africa

W.D. Cummings

British softbill imports

Jeffrey Trollope's notes on British softbill imports (Volume 93, 3: 171-173) are a worthwhile effort to record some of the interesting birds available to aviculturists in recent years, which will undoubtedly be of great interest in the future. I would like to add a few species to Mr. Trollope's list, all of which have been imported into Britain in the 1980s. Some of the corvids below do appear on his list, but I repeat them as it is not clear to me whether they are included there as present or absent among the species imported.

Corvidae:

Short-tailed Green Magpie *Cissa thalassina*

Azure-winged Magpie

Piapiac

White-tailed Jay *Cyanocorax mystacalis*

Crested Jay *Platylophus galericulatus*

Sturnidae:

Purple-backed Starling *Sturnus sturninus*

Golden-breasted Mynah *Mino anais*

Ashy Starling *Cosmosparus unicolor*

Hildebrandt's Starling *Spreo hildebrandti*

While I share with many other aviculturists the excitement of seeing importers' lists with new, rare and beautiful species, I wonder increasingly whether we deserve these birds. Two pages on from Mr. Trollope's article is a note about the effects of the bird trade on the populations of some of Taiwan's endemic softbills. One of these, the White-eared Sibia (an easily-managed species), has now been regularly imported for at least four or five years, but I have yet to see a captive breeding record. Does this suggest that softbill breeders are generally incompetent, or perhaps that there is less interest in breeding than is often supposed? Certainly many imported softbills are destined for the showbench or for mixed aviaries not maintained primarily for breeding. The truth is that there are simply not enough people seriously committed to breeding to establish more than a small fraction of the species currently available. The number and variety of birds imported distracts many potential breeders who would achieve much better results if not presented with so much temptation to diversify their collections and overcrowd their aviaries. Inevitably breeders concentrate their efforts on those species unavailable or infrequently available from the wild.

Some readers are no doubt thinking, 'Hewston has White-eared Sibias which haven't bred, and other birds he'd do better with if they were kept on their own'. I do not claim to be perfect, but I do feel that it is time, when considering the pros and cons of the trade in wild birds as we must do, to stop fooling ourselves about our motives for keeping birds and the potential for captive breeding. I look forward to Part 2 of Jeffrey Trollope's notes.

50 Seven Waters
Leonard Stanley, Stonehouse,
Gloucestershire GL10 9Y

Nigel Hewston

AVICULTURAL SOCIETY NEWS

Spring Meeting

On Saturday, 19th March, 1988, nearly 80 members and their guests attended the spring meeting at the Society's headquarters at Warren Hill, Hartley Wintney. After a buffet lunch Mr. David Frank, curator at Leeds Castle, Maidenhead, Kent, gave an interesting talk on birds in California, illustrated by some excellent slides, after which he very kindly invited Avicultural Society members to visit the new aviaries and the Castle on Saturday, 6th August, 1988. Further details will be circulated later.

At this meeting Miss Ruth Ezra, President, presented the Avicultural Society's Medal to Mr. A. Brooker and Mr. A. Griffiths for the first successful breeding in Great Britain of the Chestnut Sparrow and the Pale-headed Mannikin, respectively. Other Certificates and Medals have been posted.

Council Meeting

At the Council Meeting which preceeded this function, Mrs. Rosemary Wiseman was elected a member of Council. The Society's Medal was awarded to Mr. J. Trollope for the first breeding of the Japanese White-eye *Zosterops japonica*, no previous record in Great Britain having been traced.

Members' List

The Council has decided that, in view of the requirements of the Data Protection Act, under which the Society is now registered, and the growing number of members who are very concerned about theft of valuable birds, the Society will no longer publish a list of members, and new members' addresses and changes of address will not be printed on the cover of the Magazine unless the member specifically requests us to do so. If members wish to contact other members for whom they have no address, this office will always be happy to forward letters on.

Promotion

A very attractive advertisement for the Society, carved on Welsh slate, has now been placed in a prominent position at Birdworld, Farnham, Surrey. Other production methods are being investigated. Donations are needed to pay for more of these plaques to be placed in British bird gardens and zoos, and we will also be glad to hear from owners of collections open to the public who are willing to put up a plaque and give out information leaflets.

Dinner Dance

A dinner and dance will be held on Saturday, 9th July 1988, at the Duke of York's Headquarters in London. Details will be sent to members individually and it is hoped that everyone will make a real effort to support this function and establish it as an annual event. It does promise to be very enjoyable and there is ample parking so please do try to come.

Autumn Meeting

The autumn meeting will be held on Saturday, 15th October 1988, at Warren Hill, Hartley Wintney. Details to follow.

Error in end papers, 1987

Members may have noticed that a page of advertisements was printed by error on the back of end paper No. ix, in Volume 93, No. 4, 1987. This will be a very obvious mistake to members who have their Magazines bound, when the end papers are put at the beginning of the volume, and, therefore, the printers have supplied us with some copies of this page with the reverse blank. Any members who would like a copy (free of charge) should please apply to the Hon. Secretary.

* * *



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The subscription rate for non-members is: British Isles £11.00; Overseas - £12.00 (30 U.S. dollars).

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AVICULTURAL MAGAZINE back numbers. Large stock available including some early issues. Sales by post only. Price list available from the Hon. Secretary, Avicultural Society, Warren Hill, Hulford's Lane, Hartley Wintney, Hants. RG27 8AG.

AUTHORS AND PUBLISHERS are welcome to contact Neville Brickell (Avicultural Research Unit, 100 Innes Road, Durban 4001, Natal, South Africa) for data or photographs of Southern African birds for publication.

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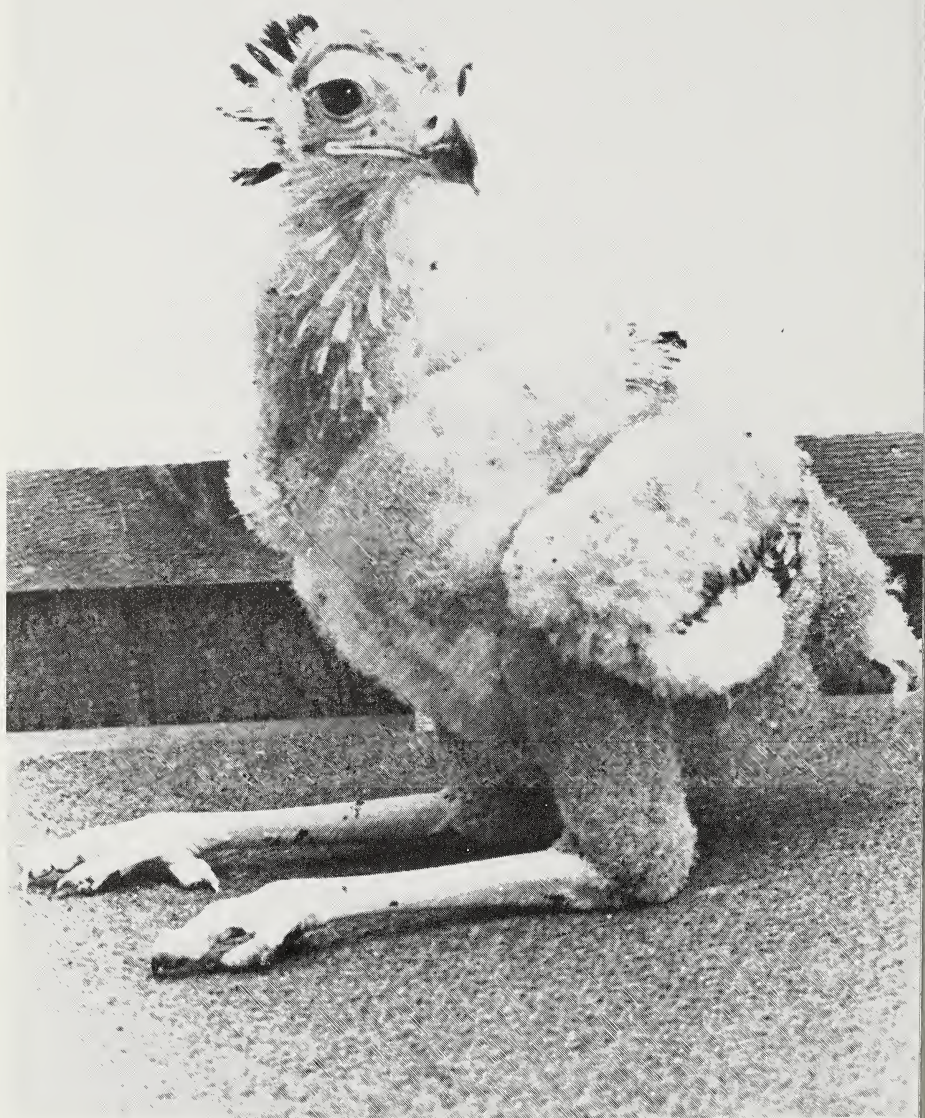
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THE AVICULTURAL MAGAZINE welcomes original articles that have not been published elsewhere and that essentially concern the aviculture of a particular bird or group of birds, or that describe their natural history. Articles should be preferably typewritten, with double spacing, and the scientific names as well as the vernacular names of birds should be given. References cited in the text should be listed at the end of the article. Line drawings should be in Indian ink on thick paper or card; black and white photographs which illustrate a particular point in the article will be used where possible and should be clearly captioned. If authors wish their eventual return, they must say so when submitting the article and write their name on the back of each photograph.

ADDRESS OF EDITOR

Mary Harvey, Honorary Editor, The Avicultural Magazine, Warren Hill, Hulford's Lane, Hartley Wintney, Hampshire RG27 8AG, England.





Oklahoma City Zoo
Secretary Bird hand-reared at the Oklahoma City Zoo in 1986

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REARING A SECRETARY BIRD

Sagittarius serpentarius

AT THE OKLAHOMA CITY ZOO

By DENISE ANDERSON (Animal Technician I)
and TREY TODD (Curator of Birds)

The Secretary Bird, traditionally classified as an aberrant falconiform species, inhabits grassland savannah throughout most of sub-Saharan Africa. Primarily cursorial, it stalks through grass to flush its prey of insects and small vertebrates which it may stun or kill with stamping blows of its feet. Nesting usually occurs in low trees, both sexes performing parental duties. A normal clutch comprises two or three eggs, which are usually incubated for some 45 days.

Single successful captive hatchings have occurred at Vogelpark Walsrode, Germany (Wennrich, 1984) and at Tierpark Berlin (W. Grummt, pers. comm.), but despite numerous specimens exhibited in the United States, no offspring had been reared prior to the bird reared at Oklahoma City Zoo in 1986.

Captive history at the Oklahoma City Zoo

The breeding pair of birds has been housed together since 1981 (the year of the female's arrival) in several locations in the Zoo including two large pens (6m x 18m and 3.5m x 13.5m) in an off-exhibit area. The diet consisted of rodents, day-old chicks, and a commercially prepared bird-of-prey diet. In these pens several infertile clutches of eggs were produced in ground nests located among grasses in March and May 1984 and March 1985.

On 24th March 1986, a single egg was laid and removed for artificial incubation in an attempt to induce the parents to lay another clutch. This proved fertile but failed to hatch. A second egg was not laid in this clutch.

Artificial Incubation

On 23rd April another egg was laid and removed. Regrettably it was necessary to move the birds from their off-exhibit pen to a large antelope

exhibit immediately after this egg was laid. On 27th April a second egg was found and removed for artificial incubation. Both eggs of this clutch proved fertile and developed well in a Humidaire incubator, Model 300A, set at 36.9°C, and an average wet-bulb reading of 30.5°C. One embryo died immediately prior to hatching, but on 7th June, after a 42-day incubation period, with an egg weight loss of just under 12%, a healthy chick hatched from the second egg. Its initial weight was 87g, its body was covered with white down, and its eyes were open, though sight appeared poorly developed. The sternal protrusion was pronounced, and the small, weak legs provided little lateral stability. To increase support, a cloth towel was crumpled on either side of the chick and this arrangement was placed inside a bowl in a brooder box equipped with a heating pad. The ambient air temperature was adjusted to 35°C.

Hand-rearing and Development

The first feed of chopped, new-born mice (2.5g) was offered on forceps approximately 18 hours after hatching. The chick immediately showed itself capable of raising its head and snapping at the food. A second feeding was given four hours later.

On day two, the brooder temperature was lowered to 32°C. The chick's weight was now 83.6g. A routine of five feedings per day was established, chopped new-born mice being fed exclusively until day four, when chopped, day-old chicks were introduced and alternated with the mice. The fifth feeding was then deleted.

On day five the nestling's feet and hock joints appeared swollen with uniform constricted areas on the rapidly lengthening tarsi apparently resulting from abnormal dessication of the scutes. Concerned by the unusual appearance of the bird's legs, we began applying A & D ointment to the affected areas. By day nine the affected scutes had sloughed off, the constrictions had disappeared, and the tarsi appeared normal. The chick also cast a pellet for the first time on this day. Grey down was beginning to replace the white natal down and crest feathers had begun to emerge.

By day 15 the chick weighed 525g and feeding times were adjusted to three times per day: 0700h, 1200h, and 1600h. Chopped adult quail and adult mice were introduced, and by day 22 food items alternated between quail, mice and rats. Pellets were regurgitated almost daily, and the chick often refused food until it had cast.

The 28-day old chick, weighing 1400g, was moved to a 1 x 1.2m brooder box kept at room temperature (26°C). The bird had begun to pick at any eye-catching object and was capable of eating food offered on a saucer, which it approached by shuffling along the box floor on its hocks. Although its first attempt to stand was made on day 33, success was not

Daily Weight Gain Record of a Secretary Bird *Sagittarius serpentarius*
Hand-reared at Oklahoma City Zoo, 1986

Day	Weight (g)	Day	Weight (g)
1	87	19	795.0
2	83.6	20	888.0
3	87.6	21	984.5
4	100.7	22	1,076.5
5	120.0	23	1,122.5
6	139.0	24	1,181.0
7	155.5	25	1,283.5
8	179.0	26	1,350.0
9	207.8	27	1,334.0
10	237.8	28	1,417.0
11	266.7	29	1,476.5
12	323.0	30	1,510.0
13	367.0	31	1,596.0
14	475.0	32	-
15	525.0	33	1,790.0
16	577.5	34	1,705.0
17	625.5	35	-
18	705.0	36	1,976.5
		37	2,090.0

achieved until day 51, when, balancing with outstretched wings, the bird remained upright for a few seconds. Food offered had been decreased to twice daily when the 60-day old chick was moved to a large room with an outside yard. By day 71 the bird was standing and walking well, and was soon capable of running, leaping and making mock attacks at blowing leaves. Reactions to live prey appeared innate, snakes being dispatched by blows of the feet accompanied by animated leaping and agitated crest erection.

This bird's juvenile plumage is noticeably marked with brown, as opposed to clear grey, a condition reported occasionally in wild juveniles and suggested by Wennrich (1984) to be a possible indicator of female gender. Since independence, this bird has been held in an off-exhibit 4.5 x 6m area with inside heated shelter and access to an outside yard 7.5 x 9 m in warm weather. It is planned to introduce the bird to an ungulate exhibit in the spring. Present diet consists of 10 to 12 mice, six to eight day-old chicks, or a mixture of the two items, and 115g commercial bird-of-prey diet daily. On 15th March 1987, at adult size, the bird's weight was approximately 4.5 kg.

Conclusion

Though only the first rearing of this species in an American zoo, we

feel it is, nevertheless, a significant achievement, providing valuable data and experience, and demonstrating the potential for captive husbandry and reproduction of this unique bird. It is hoped that further success will be achieved, both at this Zoo and elsewhere, to contribute to our understanding of its breeding biology, plumage changes and behavioural development.

REFERENCES

- WENNRICH, G. (1984). First captive breeding of the Secretary Bird *Sagittarius serpentarius* at the Walsrode Bird Park. *International Zoo Yearbook*, 23: 64-66.

* * *

BREEDING THE ANTIPODES ISLAND UNICOLOR OR GREEN PARRAKEET *Cyanoramphus unicolor* AT THE WELLINGTON ZOO, NEW ZEALAND

By RON GOUDSWAARD
(Senior Bird Keeper)

The Unicolor is found naturally only on the main island of the Antipodes Islands, a small, uninhabited group located 730km south-east of New Zealand. Unicors are the largest of the *Cyanoramphus* parrakeets and they are a lovely grass green colour with a slightly turquoise sheen on their heads and necks. They share the island with Reischek's Parrakeet *C. novaezelandiae hotchstetteri*, which is another closely related species, only slightly smaller in size and which has a red forehead and eye stripe, similar to the Red-crowned Parrakeet *C. n. novaezelandiae* of the New Zealand mainland.

Both the Unicolor and Reischek's Parrakeets are naturally tame and make delightful aviary subjects. They are very trusting and like nothing better than to fly on to your shoulder as soon as you enter the aviary, and explore your person. The experience can be painful when you have an aviary full of 'untrained' young birds because they delight in tweaking your earlobes. Fortunately they do eventually learn from your erratic fly swatting movements that nipping earlobes, and plucking hairs from the back of your neck, are not tolerated. They are so tame, curious and confident that to catch one, all you have to do is place your empty carry cage, with its doors open, on the floor of the aviary and wait for one to go in. The Wildlife Officers reported that they caught our original birds



David Gregorie

Antipodes Island Unicolor Parrakeet at the Wellington Zoo, New Zealand

with a butterfly net. The Unicolors are delightful company, cheerful, intelligent, and talkative without being noisy, and they are very active. Unfortunately, they are like Patagonian Conures in that their tail feathers are soon frayed and broken from climbing up and down the wire netting. You cannot leave a broom standing against the wall without one sidling up to push it over and any shrub is defoliated in no time at all.

In 1969 three pairs were collected from the Antipodes Islands by the New Zealand Wildlife Service. One bird died and was replaced in 1970. From this group a captive population was established at Mount Bruce Native Bird Reserve. These were then distributed among certain institutions including Auckland Zoo, Wellington Zoo, and Brooklands Zoo, New Plymouth. Wellington Zoo received its first pair of Unicolors on 29th June, 1974. However, they failed to breed successfully, the male breaking the eggs as they were laid, and when the female died on 31st October 1979, the male was given to Peter McKenzie, a private breeder who was enjoying considerable success with Kakarikis (Red-crowned and Yellow-crowned Parrakeets). Of the above institutions only Brooklands Zoo was successful in breeding them. The private breeders were more successful and the captive population increased steadily.

In the winter of 1983 the Wellington Zoo was again presented with a pair. The female arrived on the 23rd May from Mr. and Mrs. Heatherbell, private breeders from Nelson who have a very good record for breeding native parrots. The male arrived on 1st June from the Wildlife Service Centre at Te Anau. He arrived after a spate of deaths in several institutions due to a viral infection similar to leucosis. Consequently the male was quarantined in the hospital until 25th June before it was deemed safe for him to join the female. Males have a slightly larger head, a correspondingly heavier bill, the turquoise is slightly more pronounced and our males are decidedly bolder than our females.

The birds' natural friendliness to people extends towards each other. When the male was introduced to the female in her aviary on 25th June they made friends instantly. First the female led him around the aviary with lots of talking on both sides. The vocalising is recognisably similar to Red-crowned Parrakeet calls but seems a lot more expressive. Unfortunately it is rather hard to describe. The male gradually became more excited and they both descended to the ground at the front of the aviary, where the male started displaying to the female. His display was different to anything I had seen and I have seen it on only one other occasion since then. The male ran several tight circles around the female, and as he ran he rapidly tapped the outer curve of his bill on the ground as if knocking on a door.

Then he faced her and placed the side of his head on the ground, first

one side and then the other, repeated several times in succession. They were introduced at 9.45 a.m. When next checked, at 10.30 a.m., the male was quietly feeding the female inside the house. But it was not until nearly one month later, on 22nd July, that mating was seen for the first time, which was understandable considering that it was the middle of winter.

Over the next couple of months the matings became more frequent and on 20th September, in early spring, two nest boxes were provided. The aviary measures 5.75m x 1.95m wide and 2.8 m high. The back is enclosed for 1.5m and a further 1 m is roofed over. Grass sods were grown in a raised garden on each side of a central path. The nest boxes are slightly larger than our standard Kakariki boxes and measure 150 x 200 x 530mm tall inside, with a 68mm diameter entry hole near the top which I hoped would be too small for the male to enter. In the wild Unicolors are reported to nest in burrows on the ground under tussock plants and Mr. Heatherbell told me that his birds preferred to use a nest-box that was fitted with a sloping entrance tunnel. I fitted a short tunnel to the entrance of one of the boxes but the female used this box only as a last resort, and for an entirely different reason which I shall outline later. The boxes were hung on the walls, close to the ceiling under the roofed section of the aviary and the birds, forever inquisitive, inspected them immediately although the male was not seen to go inside one for many months. I should point out that for the original pair in 1975, the boxes had been placed on the ground and the male at the time broke any eggs as soon as they were laid.

From 29th September the female began spending more and more time inside the boxes and on 14th October she remained inside the box and was presumed to be sitting. The incubation period was given by Tony Cowley of Mount Bruce as 25 to 26 days. On 4th November, I was able to take a quick look inside the box while the female was being fed by the male and found they had three eggs. I was careful not to upset them because it was their first time and she had become noticeably more secretive and shy since starting to breed. I noticed that she had plucked the centre of her breast quite bare. The birds had also begun eating the grass in the aviary, Kakapo fashion. That is, the blades of the grass had been chewed down into little fibrous balls.

On 12th November the female was still sitting and it was becoming obvious that she must have been sitting in the box long before any eggs were laid, something she has done repeatedly with later clutches. It was not until 28th November that she started to spend more time off the nest and when the box was checked it was found to contain three dead chicks. Two chicks were dehydrated and had obviously died a few days previously. One chick was freshly dead but all three appeared to be less than two days old at death and to have empty crops, which meant that the parents had

not been feeding them.

The adults seemed to lose interest in breeding and it was not until 17th January the following year that the female was seen going in and out of the box. The next day she remained in the nest-box and was presumed to be sitting. The nest was left undisturbed until early on 15th February when it was found to contain two chicks, of which one was already dead. Four hours later the surviving chick still had not been fed and it was removed with the two remaining eggs to an incubator for hand-rearing. The subsequent hand-rearing will be described in a separate article.

In early April the hand-reared chick was placed in an aviary near the parents which seemed to distract the female from incubating her next clutch. However, at the end of April she proceeded to lay yet another clutch and the first of these hatched on 16th May 1984. With some idea now of the food requirements, learned from the hand-rearing experience, the Unicolors were provided with sweet corn (maize) and wholemeal bread in addition to the fruit, carrot, sow thistle *Sonchus oleraceus*, silver beet, sunflower seed mix and honey water they had already been receiving. We had been warned in 1975 by Mr. Cowley that the cause of death in our original female could be due to the rich acidic foods we had been providing at the time. Unicolors are primarily foliage feeders and he claimed that peanuts were too rich and exotic fruits such as tamarillo, kiwifruit and oranges were too acidic. Since then we have fed mainly apple, pear and banana. It was Mr. Heatherbell who warned us that Unicolors consume tremendous amounts of green food when rearing chicks and recommended that we supply large quantities of silverbeet, several times a day if necessary, honey water, carrots and carrot tops.

The extra foods paid off because when I went back, expecting to have to feed the chick, I found the parents had already fed it! A second chick, hatched the following day, was also reared although a third chick hatched on the 4th survived only a couple of days.

On 12th June it was interesting to see that the chicks had the same white spot on the back of the head as did the hand-reared chick, 'Stirling', at that age. These two also had a white spot on each elbow of the wings - presumably so that the parents can see them in the gloom of a burrow. The first fledged on 4th July and the second on 6th July. The male became extremely vocal as if advertising his prowess. He was no longer interested in landing on our shoulders and directed his attention to the parrots in the neighbouring aviary - becoming much more aggressive towards them.

Within two days the adults were seen mating again and the female was reported sitting the following day (9th July) this time in the box with the tunnel entrance. On 7th August, when she came off to feed, the box was found to contain six eggs. Unfortunately this success was short-lived.

When checked on 14th August the nest was found to contain four chicks - all dead - and two eggs. The fifth hatched on 17th and had food in the crop but was found dead on the 19th. The last egg failed to hatch and the boxes were removed for cleaning on 23rd August. The diet had been the same as for the previous chick except for dandelion leaves included with the sow thistle and the absence of fresh corn as it was now out of season.

The same two nest boxes were returned on 18th October 1984 and although they were quite excited, they did not start to lay until December. The first two eggs were laid in the tunnel box and they obviously had reservations about both boxes. The first box had been considerably chewed up to line the nest for the first two chicks and the parents were obviously unhappy about the second box as they had deserted the eggs by 20th December. The female went back to the first box but no eggs were laid until after a new box, undamaged and of the same material as the first box, was placed in the aviary on 14th March 1985. Even then it was not until May that the female was back on the nest and by the 25th the male had become his usual friendly self. On 10th June Peter McKenzie told us that he provided softbill rearing food and germinated seed for his Kararikis and this tip provided the breakthrough that we needed. We began supplying 'Greens Conditioning Food' on the 14th and since then we have not looked back. The chicks were first heard on 2nd July. By the 19th there were five chicks and all five were reared to independence. A few weeks after the chicks fledged in August the female was again sitting and hatched another four chicks in October and again four were reared.

In the 1985/86 season the birds were given the same three boxes, duly repaired, and again the tunnel box was ignored, at least until the other two boxes had been destroyed. Because they consume such prodigious amounts of green food, the chicks produce an equally prodigious amount of faeces, and the female goes to considerable length to strip slivers of wood off the inside of the box to continually reline the nest as it becomes fouled. By the time a brood has fledged there may be holes in the woodwork and the entrance has been considerably enlarged. In each season the most popular boxes were those made of soft, untreated pine. The box fitted with the tunnel was of harder wood and when they were forced to use this box for the third clutch of the season they were unable to strip it and I had to provide handfuls of shavings in the nest at regular intervals. Fortunately, by this time the parents were becoming old hands at breeding and were a lot more tolerant of my interference. The male would sit near me watching while I hauled out his chicks, one by one, cleaned out the nest, put in a new layer of clean shavings and then put the chicks back in. However, rebuilding three or four nest-boxes at the end of each season was becoming a chore. Our carpenter hit on the idea of screwing easily removable soft-

wood battens on the inside of each box. The battens are easily replaced at the end of each season.

Another lesson was learned with the establishment of our second pair. A wild-caught female was received on 27th March 1985 as a mate for our hand-reared male. They were introduced on 4th April and at first he drove her all round the aviary without actually coming to blows.

At the end of April they were given a nest-box and although the female was interested there was no sign of pairing up. We were afraid that maybe the male was too imprinted, certainly he was far more familiar with us than his parents ever were. Then, on 20th May, while I was cleaning their aviary, I noticed a change in their relationship. Instead of bickering and chasing each other they kept up a continuous contact 'talking'. As soon as I continued on to the next aviary, 'Stirling' went down to the female on the ground and began displaying to her, head down, making a deep *churring* noise while running circles around her, followed by feeding her twice. In June they were given a second box, hung high near the ceiling as usual but it was not until the following season, when the nest-boxes were lowered to the ground for a couple of weeks while the aviaries were sprayed for mites, that the female suddenly started laying in one of them. The box was left on the ground and they have been breeding in it ever since.

Although they would breed right through the winter, we now remove the boxes after they have reared two clutches.

If these delightful birds have one drawback as aviary subjects, it is that they are hopelessly accident prone. They do not have a clue how to look after themselves. They run under your feet as you move around the aviary; yes, one of our young birds has been stood on and had to be put down. Several young birds have managed to get themselves caught up by their leg bands resulting in sprains and in one case a broken leg. Another trick of theirs is to poke their heads out through the doorway just as you are closing the door; yes, one was caught. It is hard to watch simultaneously the ground at your feet, all four edges of the door, the buckets of feed you are carrying, and the birds, to make sure none escapes. That particular bird did actually recover although he had trouble holding his head up for a while! Even rotten logs placed in the aviary for them to chew proved a hazard. One male tunnelled underneath, became stuck and died before his plight could be noticed. They also like bathing and any water receptacle would have to be reasonably shallow. They are prone to infections carried by other birds. In 1983 a large proportion of the captive population in New Zealand was wiped out by avian leucosis. Unicolors should not be housed near Kakarikis which are carriers of this disease.

BREEDING RECORD FOR ANTIPODES ISLAND PARRAKEETS
AT WELLINGTON ZOO, NEW ZEALAND

<u>Date eggs first seen</u>	<u>No. of eggs</u>	<u>No. hatched</u>	<u>Date chicks first seen</u>	<u>No. reared</u>
Pair No. 1 (Te Anau male x Heatherbell female)				
4.11.83	3	3	28.11.83	0
-	4	3	15. 2.84	1
12. 4.84	3	-	-	-
-	5	3	16. 5.84	2
7. 8.84	6	5	14. 8.84	0
13.12.84	2	-	-	-
-	-	5	2. 7.85	5
27. 9.85	6	4	3.10.85	4
-	-	4	9. 8.86	4
-	-	4	9. 1.87	4
Pair No. 2 ('Stirling' male Y2651 x wild-caught female D19139).				
1. 9.86	5	3	3.10.86	3
16. 3.87	5	4	8. 4.87	4

Conclusion

There seem to be several factors involved for successful breeding of the Unicolor Parrakeets in captivity and at present we are one of the few institutions currently doing so - hence the need for this article.

Although the birds are naturally tame, they are secretive in their nesting habits and require at least two, preferably three nest-boxes. Our original male always makes a show of waiting outside the wrong box so that we cannot tell which box is in use. Our hand-reared male is not so particular in this respect - he treats us more as rivals than as a threat. I believe the lack of nest-site security, i.e. being unable to keep the nest-site secret, is the greatest cause of failure in other institutions. They continue to experience, as we did with our first pair in 1975, males going in to destroy the eggs as soon as they are laid.

The wild-caught female seemed more concerned with location. The captive-bred female was quite content to use nest-boxes hung near the ceiling whereas the wild-caught female appeared to wait until a box had been placed on the ground, which would be more similar to the conditions she would have experienced in the wild.

The nest-boxes should be of soft untreated wood with a small entry hole. Battens screwed inside the boxes provide a simple alternative. I line the boxes with potting mix as used for pot plants, but without the

fertiliser, and dampened down with water at the beginning of the season.

The birds require copious amounts of food when rearing young - particularly green food such as sow thistle or silver beet. We provide fresh food several times a day to encourage the male to keep feeding the chicks. We have found conditioning/rearing food indispensable, even though the adults seem to use it only for the first two weeks after hatching. For the latter part of rearing the green food consumption is matched by the consumption of sunflower seed. Brown bread soaked in honey water, raw carrot and fresh corn are the other three most popular items. They take very little of the germinated seeds or even seeding grasses.

ACKNOWLEDGEMENTS

I would like to thank all the staff involved directly or indirectly with looking after the Unicolor Parrakeets. Their feed requirements are demanding, particularly the collecting of fresh green food, and they make a lot of mess afterwards. I am indebted to Peter McKenzie and Mr. and Mrs. Heatherbell for sharing with me their hard won knowledge, and to Barbara Blanchard and Kerry Muller for correcting my draft copy.

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Products Mentioned

Greens Condition Food. Marketed by Masterpet Products, Wellington, New Zealand.

* * *

BREEDING THE VIOLET TOURACO

Musophaga violacea
AT BROOKFIELD ZOO, CHICAGO, USA

By NANCY BENT
(Keeper, Bird Department)

The Violet Touraco, also known as the Violet or Violaceous Plantain-eater, is one of the larger members of the family Musophagidae. There are 18 to 22 species in this family, all of which are native to Africa, south of the Sahara. The Violet Touraco is found in evergreen forests fringing the banks of streams (the 'gallery' forests) in western Africa. Its range extends from Gambia to Sierra Leone, Dahomey, Nigeria and northern Cameroon, and probably also Senegal. This range overlaps with the very similar Lady Ross's Touraco *M. rossae* only found in Cameroon. Little is known of the natural history of either species, though in the wild the Violet Touraco is most often seen in pairs and is reported to feed principally on the fruits and seeds of *Ficus* and other trees.

There is a beautiful colour plate of this species, painted by Roland Green, accompanied by a short note by David Seth-Smith, in the *Avicultural Magazine* for June, 1930, p. 141-2.

Like other touracos, the Violet Touraco possesses semi-zygodactylous feet, that is to say that the fourth toe can be positioned either forward or backwards. The inherent manoeuvrability of the outer toe allows the birds to run along branches of trees as actively as a squirrel, using their tails as rudders to maintain balance. Short, swooping flights clear gaps too large to be hopped over, and reveal the bright crimson patches on the flight feathers that are typical of many touraco species. The majority of the plumage is a shining violet blue, with the hind crown bearing fur-like, dark crimson feathers.

Nests of the Violet Touraco have been found 6-7.5m (20 to 25 feet) from the ground and consist of fragile stick platforms so transparent and flimsy that the two greyish-white eggs can be observed through the bottom. The eggs are almost perfectly round [42 x 36mm (1.65in x 1.42in) according to Mackworth-Praed; one of our eggs measured 36.25 x 35.40mm (1.43in x 1.39in)] and are about the size and texture of ping-pong balls. Nests have been found in April in Gambia and in June in Nigeria. No mention could be found in the literature of the incubation period, nor a description of nestlings or fledglings.

In December 1981, Brookfield Zoo received four Violet Touracos. When the birds were surgically sexed, it was discovered that one was a male

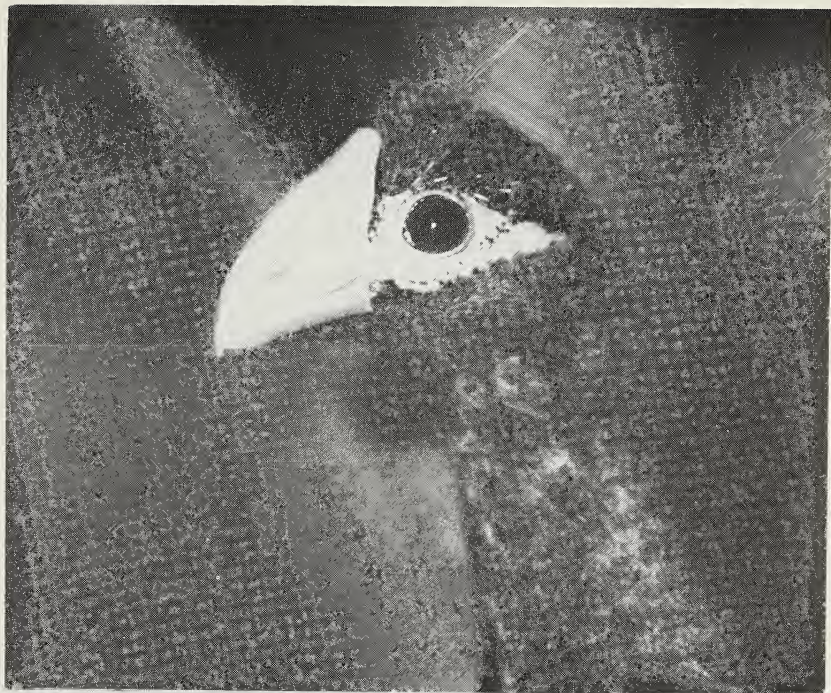
and the remaining three were females. It was decided to place a pair in the large 28m x 10m x 15m high (92 x 34 x 50 ft), mixed species, indoor flight cage at the Aquatic Bird House for breeding purposes, and to place the two remaining females in Tropic World/Africa. Tropic World, opened in 1982, was designed to exhibit representatives of forest-dwelling primates, other mammals, and birds, in settings that give the viewer the feeling of having stepped into the tropical rain forests of South America, Asia and Africa. Tropic World is the largest indoor zoo exhibit in the world. The Africa section alone is 33.5m x 58m x 23m high (110 x 190 x 75ft) and contains a family of gorillas, four species of monkeys, a pygmy hippopotamus, and varying numbers of bird species (currently Black-headed Orioles, a Bristleball, African Spoonbills, Lilac-breasted Rollers, Jackson's Hornbills and Hadada Ibis, along with the Violet Touracos).

In March 1983, one of the female Touracos in Tropic World/Africa was found dead. As touracos had done very well in this large exhibit, and since the pair of birds at the Aquatic Bird House had never shown any courtship behaviour or interest in breeding, it was decided to move the pair into Tropic World/Africa and the single female into the Aquatic Bird House. This was accomplished in December 1983.

It was originally thought that the extra space provided by the enormous size of the Tropic World/Africa exhibit would provide the needed stimulus to induce the Violet Touracos to breed. In retrospect, it appears that Tropic World/Africa is also an excellent replica of the gallery forests where these birds are found in the wild, and that we could not have designed a better breeding site. It did not take long for the pair of Touracos to feel at home; courtship feeding of the female by the male, chasing of the female, and unison calling were all observed during their first month of residence.

An egg was found broken on the public walkway of the exhibit in April 1984, and then things began to get moving. In May, the pair was seen carrying nesting material (twigs of *Ficus* broken from the exhibit trees) to the north wall of the exhibit above the public walkway. This wall consists of artificial rockwork with built-in planters full of live and artificial plants and extends to approximately 6m (20ft) above the public walkway. Between the top of this wall and the ceiling of the exhibit is approximately 1m (2-3ft) of wire hardware cloth, permitting ventilation and lighting of the exhibit without allowing the birds to escape. The hardware cloth is hidden behind a screening of plastic plants and natural branches.

By the middle of May, only the male was observed during the morning inventory of the exhibit birds - the female had apparently begun incubation. A few days later, the female was observed out in the exhibit in the



Adult Violet Touraco - detail of head.

Chicago Zoological Society
Violet Touraco chicks, aged 18 days

evenings when the male would disappear (presumably to relieve his mate on the nest). This pattern held for roughly 23 days.

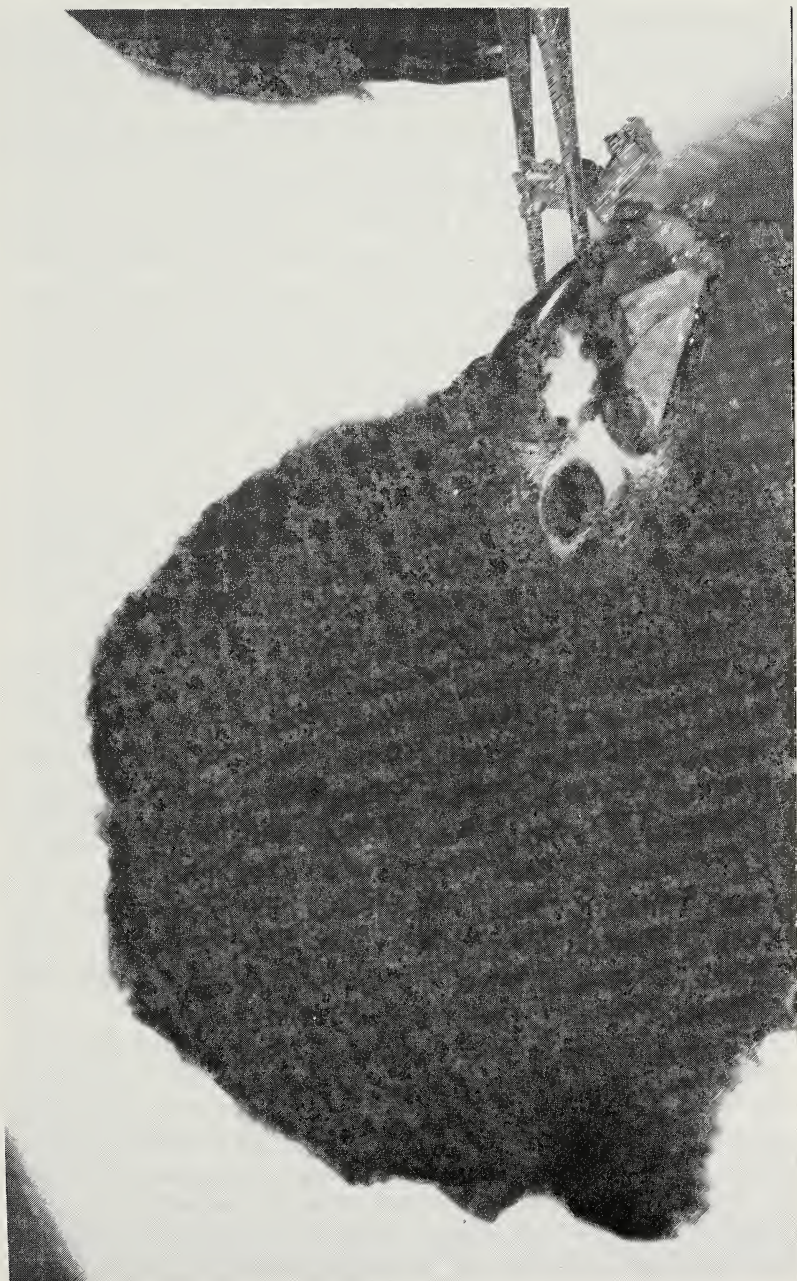
On 15th June, both birds were seen out in the exhibit for the first time since the incubation began, calling and beaking (a behaviour pattern in which the birds rub and rattle their beaks together - it is thought to strengthen the pair bond). The male was also observed searching through the planters. We assumed that the eggs had hatched, and that the birds were searching for crickets (which are thrown out into the exhibit daily) or other live food to feed their young. An extra pan of the birds' staple diet, consisting of Brookfield Zoo's prepared frugivore diet (diet formulation available on request), dry dog food, and liberal amounts of chopped lettuce, was provided. Extra crickets were also thrown into the planters daily. Other species of touraco are known to regurgitate food for their young, and this species was assumed to be no exception.

There is a catwalk behind the north wall of Tropic World/Africa that is used by maintenance personnel as access to the exhibit lights, air handlers and other equipment. This catwalk also became a convenient observation point when the flimsy twig nest containing two charcoal grey, downy young was discovered a few days after the presumed hatch date. The female was very defensive of her young, so the keeper only observed the nest for a short period. The young were seen to be fat and healthy.

At this point, a decision had to be made regarding the future management of the chicks. It is, of course, always preferable to allow the parent birds to rear their own young. However, allowing the chicks to fledge from the nest into an exhibit where the nearest floor is 6m down and made of concrete is not particularly safe. Though touraco chicks usually climb around on branches for several days before they begin to fly, it was felt that these should be removed for hand-rearing before that time. Other species of touraco that have been bred in captivity have left the nest as early as 15 days after hatching (Grey Touraco *Corythaixoides concolor* at the Jersey Wildlife Preservation Trust). We wanted to leave the chicks with their parents as long as possible, so we decided to pull the chicks from the nest at 14 days old. This was accomplished with an extension ladder, a bucket on a rope, and the need for extra hands to fend off the attacks of the female.

The chicks were put in an incubator set at 33°C (85°F). They were placed together in a food crock lined with paper towels with straw on the top for their feet to grasp. After the first day bits of what appeared to be straw appeared in the defecation of one of the chicks so the bedding was changed to short twigs.

The hand-rearing diet we used was basically the same frugivorous diet offered to the adults, with the addition of chopped, new-born mice. The



Chicago Zoological Society

Violet Touraco chick - aged 18 days

chicks were easily taught to be hand-fed on the first day, as they would threat gape and lunge at the keeper whenever approached, making it easy to pop food into their open mouths. After the first few feedings they readily begged when the incubator door was opened. The chicks were fed every hour for the first two days, every hour and a half for the next three days, then every two hours until they were eating on their own. The chicks began to pick up food from the pan at approximately 19 days old, and were eating totally on their own by 25-26 days old.

Because of the problem of imprinting on keepers, reported in Red-crested Touracos at Riverbanks Zoological Park, South Carolina (Robert Seibels, pers. comm.), a puppet was made from a stuffed navy blue sweat-shirt sleeve with a Violet Touraco face painted on it. Though they were not fed with the puppet, it was present with the chicks at all times. They seemed to more or less ignore it, often perching on it. However, neither these two chicks nor any of our subsequent chicks imprinted on their keepers so we felt the puppet was a good precaution.

In the space of seven months in 1984-85, we reared six more Violet Touraco chicks, using the methods outlined above. Of the eight chicks reared, six came from two-egg clutches and two came from one-egg clutches. No differences in weight gain, development, or degree of tameness were noted between chicks reared singly and chicks reared together.

After the last chick (a singleton) was pulled for hand-rearing in March 1985, the pair became erratic in their nest attempts. An egg was laid in one of the old nests (the pair alternated between two nests for all their breeding), but was found out of the nest a few days later. During this period, the male was alternately aggressive and attentive to his mate, culminating in a bout of intensive chasing, lasting for several days. The female spent most of her time hiding, since whenever she came out to eat or bathe the male would pounce on her. At this point we decided to remove the birds from Tropic World/Africa in order to rest the female. The birds were easily trapped using grapes for bait and moved to an off-exhibit breeding facility. One of their male offspring took their place in the exhibit, where he was later joined by our extra wild-caught female.

At the time of writing, our original parent birds are housed back in the large flight cage in the Aquatic Bird House. They have demonstrated all of the normal courtship behaviour and have laid one clutch of eggs, which unfortunately turned out to be infertile. They are currently (February 1988) sitting on their second clutch. The young hand-reared male in Tropic World/Africa has been unlucky. Though he has courted and subsequently pair-bonded with two wild-caught females, both came to untimely ends just as nest-building commenced. We are now looking for another female for our healthy young male, and hoping for more success from his parents.

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Footnote

(July 1988) Since the above was completed, our original parent birds in the Aquatic Bird House have fledged their second and third clutches. The third is extremely interesting, as it consisted of three healthy chicks, all of whom fledged successfully. This is, to my knowledge, the first time a touraco species has reared a clutch of three. We were also able to obtain a captive-bred female from the Houston (Texas) Zoological Garden for our young male in Tropic World-Africa. This pair has built a nest and appears totally compatible, but as yet has laid no eggs.

BREEDING THE COLLARED SUNBIRD

Anthreptes collaris

By A. RIDD

(Exeter, Devon)

This small sunbird is found in moist forest and thick bush along the entire coastal belt of the eastern half of southern Africa, as well as in the north-eastern regions.

It measures about 10 cm long and has a relatively straight, shortish bill. Both sexes are metallic green above, underparts are yellow but the male has a green throat with a narrow, purple chest band.

Collared Sunbirds are insectivorous and usually seen in pairs, creeping in flowering trees or creepers, looking for insects.

In 1985 I purchased a pair of Collared Sunbirds and put them at the end of my birdroom in a planted aviary which measured 9 x 4 ft (2.74 x 1.22 m) with an outside flight 9 x 5 ft (2.74 x 1.52 m).

The diet which I fed to them was a mixture consisting of two scoops of Wysoy, four teaspoons of white sugar, one heaped quarter-teaspoon of pollen, one one-eighth teaspoon yeast, four drops of Minamino to one pint of water; also simulated nectar mix with sponge cake, skinned grapes, chopped up small, and small mealworms.

In the spring of 1986, the hen started to carry bits of grass about and tried to build a nest in a hanging basket, which was planted with Impatiens. After a week, she gave up trying and built a nest on the earth of the basket.

Two eggs were laid; these hatched on the 14th day but were thrown out. I replaced them in the nest but the same thing happened again.

I was told that it was the cock that was the culprit, and on the next occasion she laid two eggs, I removed the cock and left the hen to incubate. These eggs hatched, and she fed the young on spiders and small mealworms. I had plenty of fruit flies and cricket hatchlings, but she would not look at them. After five days the weather turned dull and wet and I was unable to collect enough spiders and the two chicks died.

After five days I placed the cock back again and they mated. I had to remove him on this occasion as he was being attacked by the hen. One young was hatched but died at 10 days old, as it was getting late in the year and I could not collect a sufficient number of spiders. It was winter now so I hoped that I would have better luck in the coming spring. During the winter I tried a number of times to put the cock back, but each time he was attacked by the hen, and blood was drawn. All through the winter I had to keep them apart.

In the spring of 1987 the birds were calling to each other. The hen started to carry grass about and tried to build a nest in some dead branches but the grass kept on falling down. I made a nest which I fixed between the branches and she then lined it with hair and feathers. I let the cock in for about 10 minutes but had to take him away after mating. I did this for three days to make sure that she had been mated.

Two eggs were laid but when I entered the birdroom on the morning of the seventh day of incubation, I found that the hen was not sitting. On checking the flights I found that I had shut her out in the outside flight all night. I let her in and she went straight to the nectar and drank at least half of a tube and then went back to sit on the eggs. I did not hold out much hope that the chicks would hatch but to my surprise, they did so on the 15th day but only lived for two days. After about five days, the hen started to call the cock again, so I placed him in with the hen for ten-minute periods for the next three days.

On 1st June two eggs were laid and chicks hatched on 14th June. I started to collect spiders, but again there were very few about and I must thank my friend Geoff Wragg, who came out spider hunting with me every night.

We travelled miles looking for gorse bushes and tapping them to dislodge the spiders into a plastic icecream carton. One young died at seven days due to lack of live food.

We had to find a way to get more spiders and came up with an idea of a hoop made of half-inch flat iron with two handles.

The hoop was covered with plastic with a dip in the centre. I held the device under the bushes whilst Geoff tapped them with a tennis racket. On the first night we got about 100 spiders.

The weather was now getting warmer, and we managed to find a spot quite near - a side road off a main trunk road, with an abundance of bushes along both sides. To our surprise we were collecting around 500 spiders each night. The chick was growing fast, and I contacted a firm which breed live food and they were able to supply me with wax moth larvae, some of which were about an inch long (0.02m). The hen would beat these against a perch and then feed them to the chick; I gave her six in the evening so that I was satisfied that the chick had been well fed for the night.

On 28th June, the chick left the nest and did not return, preferring to sleep on a perch beside its mother.

My wife was watching the chick exploring the outside flight, and to her surprise saw a hen Copper Sunbird in the next flight feed the chick through the wire netting. About 11 days later it was feeding itself on nectar, and we were able to take a night off from spider hunting.

Despite all the time and patience required, it was well worth the trouble as I believe that this is the first breeding of this species in Britain.

On 1st September, the hen was calling again and so I placed the cock in with her. On the 7th she was sitting on two eggs and we were out spider-hunting again.

One chick hatched on 24th September, three days overdue, possibly because the weather was colder. We collected a good number of spiders.

The second chick hatched on 27th September but died the next day. We continued collecting spiders whenever the weather permitted.

By 9th October the chick was standing on the side of the nest, flapping its wings, and the hen was feeding it on wax moth larvae and white mealworms, plus whatever spiders we could catch.

By 11th October the chick was ready to leave the nest and the hen was trying to entice it to fly by holding a larvae near it, then moving away. The weather was fine so we went out spider-hunting and collected around 300 which I put in the outside flight. The hen made a lot of noise and I thought she was calling to the chick to leave the nest so I did not go into the birdroom until the evening when I went there to feed the birds. I knew that something was amiss because all the birds were restless and on checking I found that the young sunbird was not in the nest. Looking round the flight I found that it was dead and hanging down behind the nest, its foot entwined in some fine grass. I concluded that it had tried to fly to a branch and was stopped in mid-air because the other end of the grass was woven into the inside of the nest and it then fell down behind the nest. I was devastated after the chick had got so far and then was to die like this.

I shall hope to have success again in 1988; I think the first chick is a cock but I am not sure and would be much obliged to anyone who may have a suitable mate for it.

As described above, the Collared Sunbird *Anthreptes collaris* was bred by Mr. A. Ridd in 1987 and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or of any other reason that would disqualify this claim, is asked to contact the Hon. Secretary.

* * *

HAND-REARING A PURPLE-BELLIED PARROT

Triclaria malachitacea

By ROSEMARY LOW

(Curator of Birds, Loro Parque, Tenerife)

The single member of the genus *Triclaria* is a most distinctive neotropical parrot. The specific name *malachitacea* must refer to the rich, glossy dark green of the plumage, for the dictionary definition of malachite is a green mineral taking a high polish. Both sexes have iridescent sky blue under the wings and the tail tipped with sky blue. Sexual dimorphism is marked, the male having the abdomen and part of the lower breast violet, these areas being green in the female. Sex is apparent in nestlings.

The Purple-bellied Parrot is unique in appearance, behaviour and voice. The latter is exceptional. The male has a melodious, thrush-like song; the female renders a more subdued warbling. Not only does the male have a song which is a joy to listen to, but in my opinion few parrots are more pleasing in appearance and personality.

After keeping parrots for 30 years, inevitably a few birds etch themselves indelibly on one's memory. One of these was a male Purple-bellied Parrot which gave me enormous pleasure during ten years in my aviaries.

This species is very rare in aviculture for several reasons: it is endemic to Brazil; it is difficult to establish in captivity; and it is not likely to attract the attention of trappers, whose demand is mainly for Amazon parrots and macaws.

It may be the only parrot endemic to south-eastern Brazil which is not endangered - yet. A forest bird, its stronghold is the lower montane forest of the Sierra del Mar which is too steep and too wet for agricultural use.

I believe that captive breeding has occurred in only two or three collections, including Loro Parque. At the beginning of 1988 two pairs nested here. Both females laid clutches of four eggs. One clutch (first egg - 20th January) was infertile; the other (first egg - 7th January) was fertile. Two eggs were removed to the incubator when pipping commenced. The first chick hatched on 6th February (weight 6.2g), the second hatched in the nest and the third hatched on 11th February in the incubator (6.7g). One was returned to the nest immediately and the other after three days. The unhatched egg measured 22 x 27mm.

The three young were very well cared for, thus it was totally unexpected to find one dead in the nest on 29th February; the cause of death could not be ascertained. The two surviving chicks were then taken to the



Rosemary Low

Purple-bellied Parrot chick hatching

hand-rearing room. A very distressing event followed a few minutes later: one of the chicks died of shock. (On autopsy it was found to be a male.) In 15 months there have been three cases of chicks dying within minutes of being removed from the nest - something which I had never previously experienced.

The surviving chick proved easy to rear. The food, fed by spoon, consisted of Nestle's baby cereals, wheat germ cereal, sunflower seed kernels, papaya or apple, carrot and calcium and mineral additives.

As the young *Triclaria* grew, its independent nature became apparent. Never did it show any affection towards those who fed it. It would solicit feeding with head-bobbing movements and a rapid *chack-chack-chack-chack*, not unlike the rarely heard alarm call of an adult. It was easy to handle until the weaning stage when it disliked being held, although never did it bite. It also seemed to dislike being caged. It was moved from brooder to cage at 45 days and was perching two days later.

By 12th March (33 days) I could be certain of its sex - a female! This was



Purple-bellied Parrot chick, aged 32 days

Rosemary Low

good news as we had an unpaired male; females of this species are even harder to obtain than males. At this stage all the feathers of the underparts had erupted - and all were green; I had watched anxiously for any sign of violet!

During the weaning period she took corn-on-the-cob almost to the exclusion of other foods. She weaned quickly and left the hand-rearing room on 3rd May, aged 84 days. She continued to receive fresh corn for some weeks and remained caged indoors for another 10 days.

Then, at the early age of 13 weeks, she was placed with the male, after one of his wings was clipped. In the event, this precaution was unnecessary. From her behaviour towards those she knew, I guessed that she would soon assert her authority with the male, and this proved to be the case.

The pair were housed in a suspended cage in the new (second) breeding centre and, in spite of her tender age, she soon settled down. But she would still give food-soliciting movements at the sight of her favourite corn-on-the-cob (maize).

The accompanying table shows her weights during the rearing period. It is of interest that the weight at weaning, about 120g (80 days) was first gained at the age of 41 days.

WEIGHTS IN GRAMS OF THE PURPLE-BELLIED PARROT CHICK
BEFORE AND AFTER THE FIRST FEED OF THE DAY

Age in days	Weight	Age in Days	Weight
21	63/70	45	124/134
22	65/71	47	121/132
23	69/75	49	118/130
24	79/84	51	120/132
25	81/91	53	119/132
26	83/91	55	120/132
27	92/103	57	120/128
28	99/105	59	120/132
29	90/97	61	116/127
30	93/102	63	117/129
31	95/105	65	117/129
32	97/105	67	120/136
33	99/110	69	122/131
34	102/110	71	125/143
35	103/115	73	128/133
37	111/121	75	124/133
39	114/126	77	121/139
41	120/128	79	123/131
42	122/131	81	120/130
44	123/132	83 - left hand-rearing room	

LONG-TAILED GLOSSY STARLINGS
Lamprotornis caudatus
IN FIELD AND AVIARY WITH OBSERVATIONS ON
CO-OPERATIVE BREEDING IN CAPTIVITY

By **ROGER WILKINSON**
 (Curator of Birds, Chester Zoo)

Long-tailed Glossy Starlings are widely distributed in the savannah belt of sub-Saharan Africa from Senegal east to the Sudan. Two similar species of more restricted distribution are Ruppell's Starling *Lamprotornis purpuropterus* found in East Africa and Meve's Starling *Lamprotornis mevesii* of southern Africa. Long-tailed Glossy Starlings are distinguished by having velvety black spots on their wing coverts and scapulars and also have longer tails than their close relatives.

I have been fortunate in being able to study Long-tailed Glossy Starlings in the wild and in captivity. Field observations were made whilst resident in Nigeria between September 1977 and July 1983, and again on a brief visit in February 1987. Studies of captive birds were made at Chester Zoo over the period September 1983 to the present but most relate to observations at one nest in October and December 1987.

Long-tailed Glossy Starlings have been imported frequently into the United Kingdom but surprisingly previous captive breedings do not appear to have been reported here for *L. caudatus*, although they have for both *L. mevesii* and *L. purpuropterus* (Coles, 1986).

History at Chester Zoo

Chester Zoo records indicate that Long-tailed Glossy Starlings have been held without interruption since 1974. The first breeding success appears to have been in autumn 1979. No further breeding attempts occurred and in June 1984 the present breeding female was purchased. The deaths of two of the original stock preceded the next breeding attempt in 1985 when a chick was fledged on 13th November. This bird was not reared to maturity and a further death in 1986 reduced the stock to two birds; a male obtained in 1978 and the female purchased in 1984. This pair of birds successfully fledged a chick on 21st May 1986 which remained with its parents in the free-flight of the Tropical House. In May 1987 this young bird, now a year old, was observed along with its parents carrying food into the nest-box. The first chick fledged from this nest on 28th May and by 1st June two more chicks had fledged. Two of these were lost into water areas within the Tropical House but the third was

successfully reared. This latter bird had a few pale feathers which, at the age of six months, still served to distinguish it from the 1986 young. In October 1987 the breeding pair nested again and two chicks fledged on 14th and 15th November. Both immatures (the one bred in 1986, and that hatched in May 1987) remained with the parents and both were seen to feed this last brood both in the nest and after fledging. Two chicks fledged successfully but the 1986 hatched subadult disappeared without trace in late December 1987.

Food and feeding

Long-tailed Glossy Starlings forage mainly on the ground but also in trees taking a variety of insects and fruit as available. At Kano, Nigeria, food items noted included the ripe fruits of the introduced neem tree *Azadirachta indica* and the large terrestrial ants *Mesor galla*.

In captivity the birds thrive on a standard softbill diet, which at Chester Zoo comprises minced meat, grated hard-boiled egg, carrot and biscuit meal blended with proprietary brands of insectivorous mixture plus chopped fruit and live locusts and mealworms. Insects are particularly important when small young are in the nest for in captivity these are then fed almost exclusively on live food.

Moult, Weights, etc.

Biometric data obtained from a number of birds captured at Kano are given in Table 1. Most of the birds were caught using locally crafted leg snares at favoured feeding locations, especially those where ants were actively foraging. No snares were left unattended and as soon as a bird was caught it was released from the snare, weighed, measured and inspected for moult. Coloured celluloid leg bands were used so that each bird caught could subsequently be individually identified and the bird released in the area where it was caught.

There is a considerable range in size measured both as weight and wing length. Bannerman (1953) notes that males generally exceed females with respect to both wing and tail lengths and records little overlap between the sexes; males having wing lengths of 170-201mm (cf females of 160-172mm) and tail length of 260-360mm (cf females of 205-275mm). Mackworth-Praed and Grant (1973) give a wider range for wing lengths of 151-203mm but do not distinguish between the sexes.

All ten birds caught at Kano had wing lengths equal to or greater than 174 mm but I suspect this reflects the shrinkage of museum skins rather than indicating that all were males. The five birds with wing lengths between 198-202mm are clearly all adult males. The five between 175-194mm might include females and subadult males. One bird (Y + DB) re-

Roger Wilkinson



Immature Long-tailed Glossy Starling at Chester Zoo

Table 1 Details of Long-tailed Glossy Starlings at Kano

Date	Ring Colours	Weight (g)	Wing (mm)	Moult/Remarks
4. 9.80	GRG	114	179	No moult
20.11.80	YR	133	202	Secondaries moulting
20.11.80	YB	126	186	No moult
30.12.80	MY	127	199	No moult
17.3.81	RB	114	188	Primary and Secondary moult
16.6.81	----	----	198	Secondaries moulting
20.10.81	GY	103	175	Secondaries and tail moulting
17,11,81	WO	127	200	No moult
4.2.82	YB	116	194	No moult/Retrap
1.6.82	MR	111	174	Primary and secondary moult
28.7.82	PM	125	200	No moult

trapped after 15 months had increased its wing length from 186 to 194mm.

Some birds were clearly distinguishable as to sex in the field. In one group of birds my field notes recall one very large male with a purple gloss being seen next to a much smaller, slighter-headed green glossed female. Bannerman (1953) remarks on 'a curious variety of this bird in which the mantle, breast and wings are bright blue with purple reflections instead of being only green as in normally coloured examples.'

One bird caught in March had recently begun primary wing moult, one in early June was half-way through primary moult and another in June was completing replacement of its secondaries. Although one bird caught in early September was not moulting, another caught in late October was renewing secondaries and tail feathers. One of three starlings caught in November showed symmetrical replacement of one of its inner secondaries. Several birds watched on 5th March 1981 were moulting tail feathers. Probably the moult season extends over March to October but is not fully synchronised within the population; one bird caught in July showed no evidence of moult.

Captive birds were not systematically examined for moult but one bird purchased on 8th June was then halfway through its primary moult, and the breeding male underwent a pronounced head moult whilst still feeding



Roger Wilkinson

Adult Long-tailed Glossy Starling at Kano, Nigeria

nestlings in November 1987.

Social Organisation

William Serle (1943) studied Long-tailed Glossy Starlings in northern Nigeria where he noted that although gregarious in the dry season with flocks of a dozen or so, they were encountered more often singly or in pairs in July and August. However, where there were groups of baobab trees, in which they nested, many pairs could be found in close proximity, eggs being laid in September and October (Bannerman, 1953).

At Kano the rains usually start in April or May peaking in July and August and finishing in September and October. My observations indicated that small flocks of four to seven birds were most frequent in the dry season but that all larger groups were found in June and especially July when flocks of over 20 birds were encountered. Singletons and smaller parties were most frequent in October, when the birds would be expected to be incubating eggs.

Long-tailed Glossy Starlings were recorded in all months on the study area of the Bayero University campus at Kano. Observation of colour-banded birds suggested that these lived in stable groups that maintained their own group territories with at least three such groups having adjacent territories on the study area.

Aggressive behaviour and displays

Large flocks of Long-tailed Starlings were most frequently seen in July when calling, display and chasing made these birds most conspicuous. I suspect that this chasing was related to boundary disputes between neighbouring flocks but too few birds were colour-banded to confirm these suspicions.

The most serious aggressive behaviour I witnessed in the wild was on 6th October 1981 when I found two birds literally locked together in combat on the ground below a suspected nest tree. One bird was on its back with its feet in the air, the other one on top of it with its legs locked to those of its combatant. The birds remained on the ground both raising their heads and calling for a full five minutes until I approached to within two feet of them. The birds then separated only to immediately re-engage in fighting, like two fighting cockerels, with their wings and tails spread and their legs outstretched towards each other. Flying at each other and grasping each other's legs they again fell to the ground to remain locked together once again. Both birds were unbanded but both large and I suspect males. A third bird, GRG, smaller than either of the contestants and almost certainly a female, watched the sparring partners then flew off, followed by both antagonists. GRG had a week previously been seen



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(above) Long-tailed Glossy Starling in *Parkia* tree. Kano Nigeria.

(below) Adult Long-tailed Glossy Starlings at Chester Zoo

showing interest in a possible nest-hole in this *Parkia* tree and was subsequently observed peering into the suspected nest-hole but nesting was not confirmed.

Observations of captive birds indicated a dominance hierarchy within the flock with the breeding pair dominant over non-breeding birds, and the youngest recruit being at the bottom of the pecking order. At the feeding station this was perfectly linear with the adult male dominant over the female, both dominant over the immatures and the older immature dominant over the youngest. However, the female was dominant over the male as well as both immatures at or close to the nest-box when chicks were present, and also in the vicinity of the fledglings.

Displays given by the captive birds included an open-bill threat display given by the breeding female to the oldest immature shortly after the chicks hatched and an open-bill begging display given by the female when soliciting food from the oldest immature near the nest-site. A frequent display involved the dropping and drooping of both wings. This was given by the male when approached by the more dominant female and may indicate a submissive posture. A similar display was given by birds attempting to entice fledglings into cover but this was then accompanied by a shivering of the wing and tail feathers.

The adult female and oldest immature were both seen to elicit begging from recent fledglings by pecking at their bills and crops. The adult female attempted to obtain food from the adult male by pecking at his bill.

Vocal behaviour

Long-tailed Glossy Starlings are extremely vocal. Bannerman (1953) notes that their calls are many and varied. Mackworth-Praed and Grant (1973) describe them as noisy birds with unpleasant raucous screeching cries and continual chattering in flight.

In northern Nigeria they are known in Hausa by a name pronounced *élékélé* which is onomatopoeic for their most commonly heard call, the sing-song quality of which is not unpleasant at a distance. Other calls included a hoarse coughing *chuc-chu-chu* heard together with *élékélé* calls from a chattering group otherwise resting in a grove of trees, and loud raucous alarm calls. In captivity loud calling accompanied mobbing of anybody approaching their fledglings too closely and calls were also given in flight when driving other bird species away from the nest area.

Breeding seasons

Elgood (1982) notes that for such a numerous and conspicuous bird, breeding is surprisingly little recorded. In six years in Kano I was unable to confirm breeding at any of several suspected nest-sites. Most published

accounts of the nesting of Long-tailed Glossy Starlings in the wild appear to derive from the observations of William Serle who noted that at Kano eggs were laid in September or October; that is at the end of the wet season. Mackworth-Praed and Grant (1973) record that in Darfur, Long-tailed Glossy Starlings breed from August to October.

At Chester Zoo three breeding attempts were initiated in October, that is at the season when these birds would be expected to be breeding in the wild, but perhaps because of the seasonally unrestricted food supply two successful breedings also occurred in May. This recalls the biannual breeding shown by the Chestnut-bellied Starling at Kano (Wilkinson, 1983) and suggests that the restrictions of the breeding season in the wild may be dictated by environmental factors imposed on an internal rhythm.

Incubation, nestling and fledgling periods

Direct inspection of the nests was not possible because of their inaccessibility and the incubation period was not determined. Casual observations suggested that incubation was only by the female. The nestling periods were calculated as 17 days for the nest in May 1987 and 21-22 days for the nest in November 1987. Fledglings remained hidden for the first few days after leaving the nest and did not begin to feed themselves until approximately two weeks later. They were still being fed occasionally, particularly by the female, some three weeks after leaving the nest.

Nestlings, fledglings and juveniles

Nestlings seen by Serle (1943) were naked at a few days old, except for a tiny patch of down over the mid-vertebral region and another patch over the scapulars. Two immature birds observed in a flock at Kano in March 1981 were distinguished by their dull yellow eyes, and the lack of gloss on their chests or the dark heads of the adults.

Fledglings left the nest-box at Chester Zoo with tails only half the adult length, each tail feather still growing basally, enclosed within its waxy sheath.

The fledglings lacked the gloss of the adults and had dark eyes compared to the bright white or pale yellowish eyes of the adult. The dark eye colour is retained for at least the first year. The young bird fledged in May 1986, still had noticeably darker eyes than the breeding adults when it was 20 months old.

Nest defence and aggression to other species

Long-tailed Glossy Starlings are larger and more powerful birds than

many of the other occupants of the Tropical House but generally behaved reasonably amicably. Although they were dominant over many smaller species at the feeding area, this has not created any management problems. However, whilst nesting the birds became noticeably aggressive especially in the area of the nest-site. The adult male spent long periods on guard near the nest-box and chased off any birds which approached the box too closely. Aggression was particularly addressed to Bar-tailed Cuckoo Doves *Macropygia unchall* but Speckled Pigeons *Columba guinea*, Schalows Touracos *Tauraco schalowi* and one particular Spree Starling *Spree superbus* that was anxious to feed the young Long-tails figured prominently amongst other birds harassed.

Most chases were initiated by the adult male but occasionally either of the two immature Starlings or the female would supplant or chase birds near the nest. On several occasions all four Long-tailed Glossy Starlings chased Bar-tailed Cuckoo Doves until these were exhausted. The female Cuckoo Doves were particularly selected for this rough treatment. The breast barring of these doves, shared with both cuckoos and accipiters - neither of which would be welcome near a nest, may have been the particular stimulus that elicited this concerted aggressive behaviour from the breeding Long-tailed Glossy Starlings.

Helping at the nest

It was previously noted how non-breeding youngsters were seen to help their parents in feeding chicks in the nest. This behaviour was studied in some detail for the nest of October/November 1987 when an older, immature bird, bred in May 1986 and a yearling fledged in May 1987 were seen to assist in rearing the chicks. This assistance involved helping to chase away potential nest predators and feeding the chicks as nestlings and later fledglings. Nest hygiene was solely the province of the breeding female. On 13 occasions, when I observed faecal sacs being removed, this duty was always performed by the female, and only she remained in the nest to brood the chicks for any extended period.

The adult male and both immatures would briefly enter the nest with food but would hesitate and wait until the female had left the nest area before feeding the chicks. On one occasion the female threatened the oldest immature that was delivering food to the chicks and in the week before the chicks were fledged, she repeatedly supplanted the youngest immature, preventing it from feeding chicks in the box. She would also steal food from the waiting adult male and both immatures in order to feed the chicks herself and was clearly dominant at the nest forcing herself past other birds waiting with food near the nest entrance.

Table 2: Helping at the nest
number of feeding visits in one hour of nest-watching

<u>Date</u>	<u>Female</u>	<u>Male</u>	<u>'86 immature</u>	<u>'87 immature</u>	<u>Total</u>
November					
2	18	0	4	1	23
3	18	3	8	7	26
4	21	2	7	1	31
5	24	1	4	4	33
6	22	2	2	0	26
9	24	0	0	0	24
10	13	0	0	0	13
11	17	1	8	0	26
12	16	1	11	0	28
13	16	2	3	0	21
14	7	3	7	3	20
15	11	3	4	4	22
17	8	3	9	8	28
18	12	5	9	9	35
26	9	1	15	2	27

Table 2 shows the number of feeding visits made by each bird over a series of one-hour observation periods. Feeding visits when food was stolen by the adult female are here attributed to the bird bringing the food even if it did not itself carry the food to the nest. The breeding female fed the chicks more frequently than any other individual especially in the week prior to the fledging of the first chick on 14th November. The male made surprisingly few feeding visits to the nest but this time was taken in sentinel duties and nest defence.

The older immature contributed significantly to the total number of feeding visits and on one occasion was also seen to carry nesting material into the box. After fledging the work of feeding the young birds was more evenly shared, although the female still accounted for the greatest percentage of all feeds and was observed still feeding the chicks over a month after they had fledged.

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BREEDING ACTIVITIES AT THE SAN DIEGO ZOO, CALIFORNIA, DURING 1987

By ALAN LIEBERMAN
(Curator, Ornithology Department)

The Bird Department at the San Diego Zoo had remarkable breeding success during the year 1987 (1st January to 31st December). Totals were 79 species hatched for a grand total of 492 individuals. The following table details the species hatched, whether they were parent-set or artificially-set, and chick survivorship.

One of the programmes initiated in 1987 was an off-exhibit unit dedicated to hand-rearing altricial species in addition to the traditional precocial species, to encourage double-clutching and to increase the Bird Department's expertise and capacity to rear nidiculous chicks successfully. To mention a few of the species which were successfully double-clutched with chicks being reared artificially and naturally during the same season, were: Palawan Peacock Pheasant, Grey-winged Trumpeter, Sun Bittern, Duivenbode's Lory, Stella's Lory, Blue and Gold Macaw, Gray Go-away Bird, Thailand Bay Owl, Fairy Bluebird, and Asiatic Azure-winged Magpie.

The additional advantage of hand-rearing is one of 'risk reduction' for pairs and species that are notoriously bad parents, especially in captivity. This is true of nearly all the pheasant species and many of the waterfowl. The breeding of eight gallinaceous species, many of which were F₁ from wild stock, will greatly enhance the available genetic variability in coming seasons. A highlight of the season was the successful artificial insemination and subsequent rearing of three chicks from wild-caught and F₁ Chinese Monals.

Ron Garrison, San Diego Zoo

Eastern Brown Pelican *Peleganus occidentalis carolinensis* at San Diego Zoo



In 1988 the Bird Department will continue its hand-rearing activities, working with new species and refining techniques and diets to reduce chick mortality.

The following table lists species and numbers of birds hatched at San Diego Zoo between 1st January and 31st December 1987. Those figures in parenthesis represent chicks that did not survive to 30 days.

SPECIES	Artificial Hatch	Parent Hatch	Total Hatch
Eastern Brown Pelican <i>Pelecanus occidentalis carolinensis</i>	0.(1).1		0.(1).1
Little Blue Heron <i>Hydranassa caerulea</i>		0.0.(1)	0.0.(1)
Hammerhead <i>Scopus umbretta</i>		2.4.(1)	2.4.(1)
African Spoonbill <i>Platalea alba</i>		0.1.1.	0.1.1.
Black-necked Swan <i>Cygnus melanocoryphus</i>	0.(2)		0.(2)
Swan Goose <i>Anser cygnoides</i>	1.1(1)		1.1(1)
Ne-Ne <i>Branta sandvicensis</i>	0.2		0.2
Ringed Teal <i>Callonetta leucophrys</i>	3(1).3.2		3(1).3.2
Andean Condor <i>Vultur gryphus</i>		1.0	1.0
Australian Brush Turkey <i>Alectura lathami</i>		0.0.7	0.0.7
Ocellated Turkey <i>Agriocharis ocellata</i>	(1).(1).14		(1).(1).14
Crested Wood Partridge <i>Rollulus roulroul</i>	0.1	0.(1)	0.1.(1)
Chinese Bamboo Partridge <i>Bambusicola thoracica</i>	(3).(2).16(2)		(3).(2).16(2)
Cabot's Tragopan <i>Tragopan caboti</i>	4(1).1		4(1).1
Temminck's Tragopan <i>T. temminckii</i>	2(2).2.48		2(2).2.48
Chinese Monal <i>Lophophorus lhuysii</i>	1.2		1.2
Elliot's Pheasant <i>Syrnaticus ellioti</i>	(2).0.9		(2).0.9
Golden Pheasant <i>Chrysolophus pictus</i>	(1).(2).10		(1).(2).10
Palawan Peacock Pheasant <i>Polyplectron emphanum</i>	0.0.25(5)	0.0.4(1)	0.0.29(6)

Vulturine Guinea Fowl <i>Acryllium vulturinum</i>	0.0.15		0.0.15
Black-breasted Quail <i>Turnix melanogaster</i>		0.0.3(3)	0.0.3(3)
Manchurian Crane <i>Grus japonensis</i>	0.0.1		0.0.1
Grey-winged Trumpeter <i>Psophia crepitans</i>	6.15	0.0.3.	6.15.3
Guam Rail <i>Rallus owstoni</i>	0.(1)		0.(1)
Grey-necked Wood Rail <i>Aramides cajanea</i>		0.0.8	0.0.8
Sun Bittern <i>Eurypyga helias</i>	0.2	1.0.1	1.2.1
Crested Serriama <i>Cariama cristata</i>		0.0.1	0.0.1
Blacksmith Plover <i>Vanellus armatus</i>	1(1).1.(1)		1(1).1.(1)
Speckled Pigeon <i>Columba guinea</i>	0.0.1(2)		0.0.1(2)
Nicobar Pigeon <i>Caloenas nicobarica</i>		0.0.1	0.0.1
Green-naped Pheasant Pigeon <i>Otidiphaps nobilis</i>	(1).0.0.		(1).0.0
Nutmeg Pigeon <i>Ducula bicolor</i>		0.0.2	0.0.2
Black Lory <i>Chalcopsitta atra</i>	0.0.2		0.0.2
Duivenbode's Lory <i>C. duivenbodei</i>	0.0.4(2)	0.0.1(3)	0.0.5(5)
Black-winged Lory <i>Eos cyanogenia</i>		0.0.3	0.0.3
Violet-necked Lory <i>E. squamata</i>	0.1		0.1
Dusky Lory <i>Pseudeos fuscata</i>		1.1	1.1
Goldie's Lorikeet <i>Trichoglossus goldiei</i>		0.0.8	0.0.8
Forsten's Lorikeet <i>T. haematodus forsteni</i>		1.0.1	1.0.1
Tahitian Lory <i>Vini peruviana</i>	0.0.3	0.(2)	0.(2).3
Stella's Lory <i>Charmosyna papou stellae</i>	0.0.7	0.0.2(2)	0.0.9(2)
Red-tailed Cockatoo <i>Calyptorhynchus magnificus naso</i>	(2).0	1.0.1	1(2).0.1
Rose-breasted Cockatoo <i>Eolophus r. roseicapillus</i>		(1).(2).3	(1).(2).3
Slender-billed Cockatoo <i>Cacatua t. tenuirostris</i>		0.0.1	0.0.1

Citron-crested Cockatoo		0.0.1(1)	0.0.1(1)
<i>C. sulphurea citrinocristata</i>			
Sulphur-crested Cockatoo		0.0.1	0.0.1
<i>C. g. galerita</i>			
Rock Peplar Parrakeet		0.0.5	0.0.5
<i>Polytelis anthopeplus</i>			
Pale-headed Rosella		1.1.2	1.1.2
<i>Platycercus adscitus</i>			
Red-fronted Kakariki		0.(1).6(2)	0.(1).6(2)
<i>Cyanoramphus novaezelandiae</i>			
Scarlet-chested Parrakeet		0.0.5(3)	0.0.5(3)
<i>Neophema splendida</i>			
Blue-crowned Hanging Parrot		7.4.5(1)	7.4.5(1)
<i>Loriculus galgulus</i>			
Derbyan Parrakeet		0.0.5(3)	0.0.5(3)
<i>Psittacula derbiana</i>			
Ring-necked Parrakeet		0.0.4	0.0.4
<i>P. krameri manillensis</i>			
Scarlet Macaw	0.0.5	0.0.(3)	0.0.5(3)
<i>Ara macao</i>			
Blue and Gold Macaw	(2).0.5(1)	0.0.2	(2).0.7(1)
<i>A. ararauna</i>			
Yellow-headed Amazon	0.0.2		0.0.2
<i>Amazona ochrocephala oratrix</i>			
Grey Go-away Bird	0.(3).1	0.0.1(1)	0.(3).2(1)
<i>Corythaixoides c. concolor</i>			
Lady Ross's Touraco	(1).0		(1).0
<i>Musophaga rossae</i>			
Schalow's Touraco		0.0.1	0.0.1
<i>Tauraco corythaix schalowi</i>			
White-cheeked Touraco		(2).0.0	(2).0.0.
<i>Tauraco leucotis</i>			
Renauld's Ground Cuckoo		0.0.2	0.0.2
<i>Carpococcyx renauldi</i>			
Thailand Bay Owl	2.0	2.0.3	4.0.3
<i>Phodilus badius</i>			
Spectacled Owl	0.1(1).0		0.1(1).0
<i>Pulsatrix perspicillata</i>			
Speckled Mousebird		(1).(1).2	(1).(1).2
<i>Colius striatus</i>			
Southern Kookaburra	0.0.1		0.0.1
<i>Dacelo novaeguineae</i>			
Abyssinian Ground Hornbill	(1).(1).1		(1).(1).1
<i>Bucorvus abyssinicus</i>			
Crested Barbet		3.0.4	3.0.4
<i>Trachyphonus v. vaillantii</i>			
Brown-breasted Bulbul		0.0.2(1)	0.0.2(1)
<i>Pycnonotus xanthorrhous</i>			
Fairy Bluebird	(3).(1).1	0.(1).3	(3).(2).4
<i>Irena puella</i>			

Ground-scraper Thrush <i>Turdus litsipsirupa</i>	(1).0.1.		(1).0.1.
Red-winged Laughing Thrush <i>Garrulax formosus</i>		0.0.1	0.0.1
Red-tailed Laughing Thrush <i>G. milnei</i>	0.(1).1		~.(1).1
Spotted Laughing Thrush <i>G. ocellatus</i>		0.0.1	0.0.1
Pekin Robin <i>Leiothrix luteo</i>		0.0.1(1)	0.0.1(1)
Bay-headed Tanager <i>Tangara gyrola</i>		0.(1).(1)	0.(1).(1)
Gouldian Finch <i>Chloebia gouldiae</i>		0.0.3	0.0.3
Diamond Sparrow <i>Emblema guttata</i>		(1).0.2	(1).0.2
Rothschild's Mynah <i>Leucopsar rothschildi</i>		3.1(2).(2)	3.1(2).(2)
Asiatic Azure-winged Magpie <i>Cyanopica cyana swinhoi</i>	2.3.0	3(1).1.1(3)	5(1).4.1(3)

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THE CHESTNUT WEAVER

Ploceus rubiginosus

By NEVILLE BRICKELL

(Avicultural Research Unit, South Africa)

My first experience with the Chestnut or Chocolate Weaver was in the aviaries of the late William Collard, Director of the Natal Zoological Gardens. My photograph of the male southern subspecies *P. r. trochae* does not do it justice, so I wish to describe this striking, unmistakable bird.

In breeding plumage, it has the forehead, crown, nape, sides of face and upper breast black; the mantle, back and lower breast are chestnut; the rump and upper tail-coverts greyish chestnut; the tail blackish tinged with green on the tips; wings blackish, edged with white to pale buff; the iris orange-brown, bill black and the legs and feet light grey. In non-breeding plumage it is similar to the female with blackish crown washed with yellowish buff and tinged with green; the mantle, back, rump and upper tail coverts are olive-brown; the eyebrow and below eye yellowish; flanks pale brown; underparts white; bill horn coloured. The northern nominate subspecies is darker reddish brown, less chestnut and in non-breeding plumage is generally richer in coloration. Immatures are similar to the non-breeding adults.

This species is gregarious at all times, generally sparse and a partial migrant in the non-breeding season. It inhabits acacia woodland and has been recorded in the northern regions as entering wheat cultivation. The range of the nominate race is from Ethiopia, Somalia, Uganda, Kenya south to northern Tanzania. *P.r. trochae* is found in Namibia (Damaraland highlands, Kaokoveld and Ovamboland). Its extreme limit is south-western Angola.

Clancey (1985) states that feeding data for wild Chestnut Weavers is little known, but they have been recorded feeding on grain, seeds, insects and probably also aloe flowers and other soft vegetable matter. In captivity they have been recorded as feeding on the seeds of Stapf's buffalo grass *Panicum stapfianum*, black seed panicum *P. novemnerve* and Guinea grass *P. maximum*, a cultivated crop in the form of pounded yellow maize, the nectar of flat-crowned aloe *Aloe marlothii*, candelabrum aloe *A. candelabrum* and Krantz aloe *A. arborescens*; insects, namely termites, beetle larvae, including mealworms, and the only arthropod in the form of spiders.

Breeding in its natural state takes place from January to March in the south, and from March to July in the north. It constructs a very untidy,



Male Chestnut Weaver

Neville Brickell

retort-shaped structure of green grass blades and a vertical entrance spout of 6-7 cm long. The lining is of grass inflorescences and a few feathers which are arranged by the female. Nests have an external length of about 21 cm and an external height of about 17 cm. Nests are attached to drooping branches of trees, mostly *Acacia* spp. and *Eucalyptus* spp. In Namibia, Braine et al (1971) observed at least 100 trees being occupied with anything from about 40-100 nests in each. At times the Chestnut Weaver may nest in close proximity to Masked Weavers *Ploceus velatus*.

Two to four eggs are laid and are white to pale greenish or light blue. Egg measurements (26): 22.5 x 15.7 (20.4-24.5 x 14.5-16.8). Incubation is probably by female only as males are known to desert the colony at the egg or chick stage. In captivity three to four eggs are laid, but due to the few birds being kept in aviaries, breeders are reluctant to record the incubation in fear of causing the birds to abandon the nests. Nestling period is recorded at about 18 to 20 days. A survey on the breeding of Chestnut

Weavers, in the wild and in captivity, is urgently needed in the near future.

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SPECIES REPORT: THE HISPANIOLAN CONURE

Aratinga chloroptera

By TONY SILVA

(Illinois, USA)

'If conservation is concerned with the survival of endangered species of birds, then private aviculturists must be recognised as an invaluable asset in the realisation of the goal. The general public is led to believe that conservation is the saving of rare species, but rarely told that many species living under the threat of extinction could be saved simply by the application of sound avicultural techniques.

'At a time when natural habitats are being systematically destroyed, due to an understandable desire of people to realise the full commercial potential of their land, it is essential that aviculturists should also be allowed to show their full potential. Failure to give aviculture a fair chance to prove its worth, will be to deny certain species their best chance of survival.'

C. Blackwell, *Cage and Aviary Birds*, 6th November, 1982: 1

When I read the above statement by Chris Blackwell several years ago, I nodded my head in agreement; this view is still with me for now, more than ever, aviculture will have to figure in conservation programmes if a large part of the parrots now extant are to remain so when it is time to greet the next century.

The Hispaniolan Conure is just one such species. A largely green conure which could easily be confused with the White-eyed *A. leucophthalmus* or Mexican Green *A. holochlora*, it is not considered attractive by most; indeed, had I not become familiar with this bird, I probably would have been of the same belief. However, it is very different from either the White-eyed or Mexican Green: its bill is of a different shade, the orbital ring is very white but the eyelids are greyish, it has red under wing coverts (not accompanied by yellow as in *leucophthalmus*, or yellowish-green as in *holochlora*) and is far shyer and quieter. It is also endangered, whereas the Mexican Green and White-eyed are common, sometimes very common, in parts of their range.

Joseph Forshaw (1978) gives two subspecies under *chloroptera*: the nominate *A. chloroptera chloroptera* and the subspecies *A. c. maugei*. However, this needs revising, for Storrs Olsson (pers. comm., 1987) concluded, after analysing the bones of both, that they differ sufficiently, especially in the shape of the bill, to be considered as separate species.

Prior to 1976 *A. maugei* was known for certain to have occupied Mona Island; that year Oleson identified bones as belonging to that species in caves in central Puerto Rico. Much speculation existed prior to this evidence, because, whilst such distinguished ornithologists as Juan Gundlach and Alexander Wetmore (1927) wrote of the conure, none was able to collect or observe it in the wild. The situation was described by Wetmore thus: 'In 1912 I was told by a number of persons that paroquets were still in existence, but always at a distance point that ever receded before me; so that I never entered what were, according to popular accounts, their haunts'.

On Mona Island, the situation was very different. Before it became extinct in 1892, three specimens were collected, the last by Wilmot W. Brown. I examined the immature female in the Field Museum of Natural History collection. At the time I wrote in my notes: 'Poorly differentiated and probably invalid subspecies. Until measurements of both subspecies are taken and analysed, perhaps by a computer, the true status of *maugei* cannot be determined.' Things have certainly changed.

The factors contributing to the decline and subsequent extinction of *maugei*, which despite now being classified as a separate species, is closely related to *chloroptera*, are unknown. Bond (1946) suggested that pigeon hunters who regularly travelled to Mona Island in the last century extirpated the conure there. On Puerto Rico, where it is reported to have disappeared by 1833 (Greenway, 1967), though it probably met its end sometime later even less is known about its disappearance. One can conjecture that lumbering of timber during the 1800s and early 1900s attributed to the ebb, or like *chloroptera* on Hispaniola, it had difficulty adapting to

living commensally with man.

Sadly, nothing can now be done to reprieve this species, but the future of *chloroptera* need not necessarily follow the path of *maugei*.

On Hispaniola, the second largest island in the Greater Antilles, composed of Haiti to the west and the Dominican Republic to the east, it is found from sea level to 3000m (9842 ft). Its habitat here is varied, ranging from arid scrub to lush forest in the mountains, where it is most numerous. Seasonally it is present on the island of Beata and Soana, off the coast of the Dominican Republic, but even then it is not plentiful. Its status on the mainland seems to vary considerably between areas.

Haiti has been largely deforested and there the conure is very rare, possibly even nearing extinction. This is a clear indication of the ebb, because Danforth (1929) encountered thousands daily in early July in the region between Mirebalais, Haiti, and San Juan in the Dominican Republic.

In the Dominican Republic it has traditionally been more plentiful, although several devastating hurricanes, loss of habitat and shooting when it raids corn crops have had a negative impact. Further, a dam was constructed earlier this decade in the region of San Juan de la Maguana, where it was particularly plentiful; its effects on the population are as yet unknown (Annabelle Dod, *in litt.*, 1980).

Given the likelihood that man will continue to make inroads into its habitat, one can expect the decline to continue, perhaps at an accelerated pace. To establish a foundation stock in captivity to safeguard the species would be a positive step in its preservation.

My interest in this species started in the mid-1970s, after I examined the last individual taken on Mona Island. A search then began that resulted in a singleton being obtained in June 1981. It was a hand-reared bird, with a slightly dropped wing which impeded long flight and had the tendency to pluck its breast, who was received in 1975 by Van Saun Park Zoo in Paramus, New Jersey.

This particular bird showed aggression to other parrots, but for some unknown reason this is especially so with Petz's or Half-moon Conures *Aratinga canicularis*. I conjectured that this behaviour may have arisen after an injury was received, perhaps by a *canicularis*.

Whilst I waited for a Hispaniolan hen to surface - my hope was that someone would have one as a pet and would respond to my numerous pleas - several other *Aratingas* were offered as potential mates. Almost invariably he responded with attacks, until a Nanday Conure was placed with him. He walked over to her and regurgitated food, which she immediately accepted; they mated about a month later.

I am not in favour of hybridising unless it is done with a specific reason in mind. In this case, the Nanday was offered in the hopes that they

would nest and that some clues about the male's potential as a father would surface. Moreover, any hybrid young would be paired back to the father, in the hopes of trying to establish a line of *chloroptera*.

The pair agreed very well, although they both resented my hands inside the cage when removing food and water bowls. If I merely stood in front of the enclosure, he would stand between me and the female and would lunge, scream and sometimes fly at the wire.

Around 10th November 1985, the female disappeared into the nest. Five days later an egg was found, having been laid exactly two months after the pair was united. Three more followed. The hen sat extremely tightly and the male now chided me loudly from the nest entrance - he would not charge or lunge. On 8th December the first chick hatched, followed by two more, on 11th and 13th. All were removed for hand-rearing because the pair had not fed the first two chicks very well and it was feared that they would die.

The hybrid young all fledged and were followed by many more. They resembled the male, though underparts had a yellowish tinge, with some feathers showing a trace of orange. Cheeks and wings had a bronze cast, upper breast had a bluish tinge, and crown was a shade of dark green, almost the colour of olive. Orbital ring was large and just slightly off-white. The bill was large and horn-coloured as in *chloroptera*, except that there was a greyish tinge near the base.

A bird that particularly resembled the male was produced in September 1982. The following year this father-daughter pair produced eggs, but all were clear, presumably because of her young age.

All of this time, my search continued. One afternoon in late 1984 the unexpected happened: a man called, after having seen my mention of the species, and offered me his six *chloroptera*, all having been imported from Haiti. Could this be another wrong lead, I wondered? I had gone after several birds, always to meet a White-eyed, but this opportunity was unique - the birds had come from Haiti and had been privately imported. When they finally arrived, I could not believe my eyes. They were genuine *chloroptera*! Luck was certainly on my side, for surgical sexing proved them to be three pairs.

One pair went to Greg Isaacs, this moving taking place so that should an unfortunate catastrophe strike, all would not be lost. They nested and in 1985 several young were reared.

The next year the pair and young were received back, after Greg decided to reduce his collection. By then my *chloroptera* had already nested and since this time a considerable number of young have been reared. This year alone over 15 fledged.

The young *chloroptera* are much like their parents, except that the red on the underside of the wings is mixed with green and the bill has greyish colour near the base of the cutting edge. They are weaned by 12 weeks and attain sexual maturity by one year old.

We have placed pairs with several aviculturists and hope to continue doing so in the future. If sufficient pairs are distributed, we will be able to see the establishment of this conure. The largest obstacle we encountered is the ratio of males to females produced; for every hen there are at least two available males. Another disappointment has been the lack of interest from aviculturists. Many appear only interested in breeding those species that will produce great monetary rewards; the gratitude of having helped to establish an endangered species appears not to be sufficient reward.

The chance of establishing an endangered species in aviculture, especially one that appears willing to reproduce, is not one that will likely repeat itself. Seizing this opportunity will allow us to look back at some future point and remark that the 1980s was not a decade of lost opportunity.

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BRITISH SOFTBILL IMPORTS: SOME OBSERVATIONS PART 2: THRAUPIDAE TO TIMALIIDAE

By JEFFREY TROLLOPE

(Hounslow)

THRAUPIDAE - Tanagers

An increasing number of bird species, especially those from Central and South America, are now imported from Europe rather than from their country of origin. In many bird families such as the tanagers, the reduction in the number of birds has been notable. However, a considerable number of the species once regularly imported has been available.

Euphonia species listed have included the Violaceous, Orange-crowned, Orange-bellied and Thick-billed.

Chlorophonia - the Blue-naped and the Blue-crowned.

The large *Tangara* genus has been well-represented by the Turquoise, Golden-eared, Bay-headed, Masked, Golden-masked, Golden, Paradise, Blue-necked, Spotted, Black-capped, Silver-throated, Emerald, Burnished-buff, Speckled, Shrank's and Beryl-spangled and Rufous-throated.

The genus *Thraupis* is small, consisting of eight species, four of which have been imported fairly frequently in recent years: the Palm, Blue-grey, Sayaca and the Blue and Yellow.

Other genera listed have included:

Anisognathus - the Black-chinned, Blue-winged and Lacrimose Mountain Tanagers.

Buthraupis - the Hooded Mountain Tanager and the Blue and Gold.

Ramphocelus - the Silver-beaked, Masked Crimson, *Pirangor*, White-winged Tanager, *Habia*, Red-crowned Ant Tanager, *Tachyphonus*, White-lined, Flame-crested, *Stephanophorus*, Diademed Tanager, *Lanio*, Fulvous Shrike-tanager, *Cissopis*, Magpie-tanager, *Schistochlamys*, Black-faced Tanager. The monotypic Swallow Tanager *Tersina viridis*, which is listed as a sub-family Tersiniinae, or given family status Tersinidae in some taxonomic works, has been imported occasionally.

ZOSTEROPIDAE - White-eyes

The most frequently imported species are the Asiatic Oriental, Chestnut-flanked and the various subspecies of the African Yellow White-eye. The Pale White-eye is occasionally imported also Everett's White-eye, the Japanese and recently the Black-capped White-eye *Z. atricapilla*, a first U.K. breeding by J. Scarret (*Foreign Bird League Magazine*, 1983:48) and probably a first U.K. importation.

NECTARINIIDAE - Sunbirds and Spiderhunters

Species of Spiderhunters *Arachnothera* listed have included the Streaked, Little, the Grey-breasted and Yellow-eared. A U.K. breeding of an *Arachnothera* species has yet to be recorded.

Sunbirds of the genus *Aethopyga* have included the Black-throated, Yellow-backed, Gould's, Fork-tailed and Nepal.

African species of the genus *Nectarinia* listed have consisted largely of those once frequently imported. The Copper Sunbird, Tacazze, Variable, Olive-bellied, White-bellied, Purple-banded, Scarlet-chested, Malachite, Superb, Carmelite, Mariqua, Splendid and Green-headed.

The genus *Anthreptes* has been represented by the Violet-backed Sunbird, Collared and Brown-throated.

DICAIDAE - Flowerpeckers

A few species of the genus *Dicaeum* have been imported in recent years: the Scarlet-backed, Buff-bellied, Orange-bellied, Yellow-vented and Philippine Flowerpecker.

In *Prionochilus* - the Scarlet-breasted Flowerpecker.

As far as can be ascertained, no species in the family has been bred in the U.K.

AEGITHALIDAE - Long-tailed Tits

Apparently the only species imported in recent years is the Black-throated *A. concinnus*.

PARIDAE - Chickadees and Titmice

Importations of the genus *Parus* have included the Green-backed, a species formerly often available. The Yellow-bellied Tit, Yellow-cheeked and Varied have also been imported.

MUSCICAPIDAE - Old World Flycatchers

Paradise Flycatchers *Terpsiphone* have been represented by the African Red-bellied and the Asian.

Muscicapa - the Verditer Flycatcher, which was formerly often available.

Niltava has included the Rufous-bellied and the Vivid Niltava *N. vivida* a species possibly not imported before 1980, also Tickell's Niltava.

The Blue and White Flycatcher *Cyanoptila* has been available; this species is listed with *Ficedula* by some authors.

Ficedula species imported include the Slaty-blue and Narcissus Flycatcher.

The Fantail Flycatchers of the genus *Rhipidura* have been listed, species

unknown.

PANURIDAE - Parrotbills

The Vinous-throated (or Webb's Parrotbill) and the Grey-headed *Paradoxornis* appear to be the only species recently imported. The first U.K. breeding of Webb's Parrotbill was recorded in 1976.

SYLVIIDAE - Old World Warblers

Tailorbirds *Orthotomus* and Prinias *Prinia* of unknown species have been advertised occasionally.

TIMALIIDAE - Babblers

Many species in this large family have been available in recent years, including a number of possible first importations.

The genus *Yuhina* has been represented by the Striated, Yellow-naped, White-collared, Black-chinned, White-bellied and the Formosan Yuhina - a first U.K. breeding (Beeson, 1984) and probable first importation.

The most frequently imported Sibia species for many years is the Black-headed. Other species listed since 1980 have included the Long-tailed, Grey Sibia and White-eared *Heterophasia auricularis*.

The monotypic Capuchin Babbler *Phyllanthus atripennis* has been listed.

The Fulvettas *Alcippe* have been represented by the Grey-cheeked and Brown-eared.

Barwings *Actinodura* - the Spectacled Barwing and the Streaked.

The genus *Leiothrix* includes the Pekin Robin, the most frequently imported and popular softbill. The number bred in captivity has shown a welcome increase in recent years, indicating this species could be established as a breeding species in the U.K. Its congener, the Silver-eared Mesia has been imported fairly frequently in small numbers.

The Red-faced Liocichla has been available in recent years and, on a few occasions, Steere's Liocichla.

Garrulax species - the Hwamei Laughing Thrush, Greater and Lesser Necklaced, the White-crested and White-throated have been fairly regular imports for many years. A number of interesting species seldom imported have been available since 1980. These have included the Red-winged, Red-tailed, Chestnut-browed, Elliot's, White-browed, Chestnut-capped, Rufous-necked, Rufous-chinned, Striated, Masked and Black-throated.

Species in other genera listed have included:

Babax - Chinese Babax.

Turdoides - Striated Babbler, Common.

Chrysomma - Yellow-eyed.

Stachyris - Chestnut-winged, Rufous-capped.

Pomatorhinus - Red-billed Scimitar Babbler, Rufous-necked, White-browed, Chestnut-backed.

Wren-Babblers of unknown genera or species have occasionally been advertised.

Part I of this article appeared in Volume 93, No. 3:171

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THE PRESIDENT'S GARDEN PARTY

Sunday, 6th June, 1988

By NIGEL HEWSTON

(Stonehouse, Gloucestershire)

One hundred members and guests gathered at Chestnut Lodge, Cobham, at the kind invitation of Miss Ruth Ezra and Mr. Raymond Sawyer, President and Vice President of the Avicultural Society. Such is the popularity of this annual event that half as many again could not obtain tickets.

The birds, grounds and hospitality were delightful as always and even the weather was kinder than in 1987. The sky threatened rain just before tea but then cleared quite miraculously - our thanks to whoever prayed at the right moment.

Each year there are new arrivals to admire in the bird collection, including species new to most if not all the visitors, but an even greater pleasure is to see the results of the breeding successes achieved each year; 1988 has so far been the best breeding season at Chestnut Lodge for many years. Splendid and Royal Starlings were feeding young in the nest, as were Azure-winged Magpies, with a second nest containing eggs less than a metre away (these sociable birds also shared their aviary with the breeding Splendid Starlings). A good crop of Avocet and Black-winged Stilt chicks was on view and incubating birds included Peruvian Thick-knees, Black Brant, Violaceous Touracos and Plumbeous Redstarts. (The Plumbeous Redstarts later successfully reared young and this is believed to be for the first time in Britain.) Red-crested Touracos had lost their eggs to other birds (since removed to another aviary) and Varied Tits had hatched, but failed to rear, chicks. A number of other species was breeding, ranging

from parrots to waterfowl, and amongst young successfully reared were two Keas, two Stella's Lorikeets, a Kookaburra, two Orinoco Geese, one Ringed Plover, Spreo Starlings and an Oystercatcher.

Among the new arrivals were birds in two groups obviously highly regarded at Chestnut Lodge: Livingstone's Touraco and White-bellied Go-away Bird bring the number of touraco species to seven, and the addition of the magnificent Spotted Laughing-thrush and the lovely little Chestnut-capped makes at least eight species of *Garrulax*. Notable among the other new birds was a pair of South American Golden-fronted Woodpeckers in beautiful condition and perhaps nicest of all, a pair of Long-tailed Broadbills already looking very much at home in the tropical house.

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Once again we are most grateful to our hosts for giving members such a wonderful afternoon. Miss Ezra presided over a most lavish and delicious tea and Mr. Sawyer went to great lengths to show the birds to everyone and answer questions. The gardens were looking at their very best and were a beautiful setting for a very pleasant occasion. As an added bonus, Miss Ezra most generously donated the ticket money to the Society's funds and together with donations, this came to £250.

Hon. Secretary.

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REVIEWS

THE BIRDS OF PAPUA NEW GUINEA

Volume I: Non-Passerines

By Brian J. Coates. Published by Dove Publications, Australia. Available from Messrs. Wheldon & Wesley, Lytton Lodge, Codicote, Hitchin, Herts.. SG4 8TE. Price £50.00. ISBN 0 9590257.

This is the first of two volumes in this title and together they will make a very significant contribution to the literature on the wonderfully rich avifauna of this region.

Volume I is beautifully produced and the photography, mainly by the author, is outstanding. Over half of the bird species found in Papua New Guinea are to be illustrated and this volume contains 493 photographs of 232 species, some never previously photographed.

Of the total 740 bird species occurring in the Papua New Guinea region, including the Bismark Archipelago and Bougainville, 377 are described in this volume. The account of each species includes field descriptions, details of distribution, habitats frequented, altitudinal ranges, ecological niche, status, unusual records, behaviour diet, voice, breeding, and subspecies. There are distribution maps for all species except some vagrants and 44 line drawings of posture and distinctive species not shown in the photographs. A bibliography and index is in each volume.

Valuable and interesting though the text is, I suspect that the book will be bought for the photographs, taken of the birds in their natural habitat, which are outstanding and reproduced in superb quality.

THE BIRDS OF AFRICA

Volume III: Parrots to Woodpeckers

Edited by C. Hilary Fry, Stuart Keith and Emil K. Urban. Published by Academic Press. Price £71.50. ISBN 0-12-137303-7.

The two previous volumes of this important work have been reviewed in this journal. Volume III completes the coverage of the non-passerine family and marks the halfway point in fulfilling the late Leslie Brown's dream of a handbook which would describe all the birds of the African Continent. It was a very ambitious project and so far it has been brilliantly achieved.

As in Volume II, invited experts describe each species under a comprehensive set of headings. African breeding species are covered in full with sections on range and status, description, voice, general habits, food and breeding biology. Non-breeding migrants are treated more briefly with

emphasis on their status and behaviour while in Africa. English, French and scientific names are given.

As before Martin Woodcock has painted the colour plates and these are the best so far in that he has found better solutions to the problem of combining portraits of a great many birds on one page, whilst obeying the laws of good composition, not at all an easy task. The colour reproduction is excellent.

The two previous volumes are still available, each at £71.50: Volume I - Gamebirds to Pigeons; Volume II - Ostrich to Falcon. Whilst a considerable outlay is required to collect the set, it will be without doubt the major source of up-to-date material on African birds and an indispensable reference for many years to come.

A DICTIONARY OF BIRDS

Edited by Bruce Campbell and Elizabeth Lack. Published by T. and A.D. Poyser Ltd. Price £39.00. ISBN 085661-039 9.

Compiled for the British Ornithologists Union, this important new work is, in effect, a replacement for *A New Dictionary of Birds* by Sir Landsborough Thomson (1964) which in turn replaced *A Dictionary of Birds* by Professor Alfred Newton (1896).

Major contributions from over 270 ornithologists around the world give authoritative accounts covering the whole field of modern ornithology. This new work, 704 pages long and encyclopaedic in treatment, ranges from general subjects such as fossil birds, migration, parental care, bird anatomy, and morphology, to descriptions of all bird families and to man-related topics such as falconry, photography, birds as pests and so on. In all, over 800,000 words, supported by 500 photographs, diagrams and drawings. With Robert Gillmor as Art Editor and Eric Hosking as Photographic Editor, the illustrations are, as one would expect, of a very high quality.

Briefly...

OPERATION CHOUGH is a most attractively produced booklet containing a collection of interesting articles on this endangered bird with some excellent illustrations. The 'Operation' referred to is a Glasgow University Project to return this species, now extinct in Cornwall, to its former territory there. H.R.H. Prince Charles, The Duke of Cornwall, wrote the Foreword, Malcolm Ellis was Honorary Editor and many other people donated their services to producing it so that profits from the sales can go towards further funding of the project. Available at £1.95 from outlets in Cornwall, or at £2.50, including post and packing, from

'Operation Chough', Paradise Park, Hayle, Cornwall TR27 4HY.

FEEDING CAGE BIRDS - A Manual of Diets for Aviculture, by K.C. Lint (Curator Emeritus of San Diego Zoo) and Alice Marie Lint, has now been published in paper-back form by Blandford Press at £7.95 ISBN 0 7137 2014 X (see original review in Volume 88, page 177).

PRUE'S COUNTRY KITCHEN by Prue Coats is published by the World Pheasant Association in aid of its international conservation projects. It is a lifetime's collection of mouth-watering recipes with a country taste but whose ingredients can be found these days in any good supermarket. It is very readable, with many funny anecdotes and some delightful drawings contributed by Will Garfit. Available from the W.P.A., P.O. Box 5, Lower Basildon, Nr. Reading RG8 9PF, Berkshire, price £12.95 ISBN:1 871060-01.

M.H.

* * *

NEWS AND VIEWS

Professor J.R. Hodges (Chairman of Council) writes:

'On my way to Australia recently I spent a few days in Bangkok. I was fortunate to stay in the Ambassador Hotel which is not only an excellent hotel but also accommodates a remarkable collection of birds. Large aviaries bordering the car park house many specimens of several species of macaw including Hyacinthine, several Eclectus Parrots, Moluccan, White and Sulphur-crested Cockatoos, flamingoes and other birds. The tables of the Sea Food Restaurant in the roof garden are discreetly arranged close to attractive aviaries containing such rare and beautiful birds as Leadbeater's, Palm and White-tailed Black Cockatoos, many more macaws and several species of smaller South American parrots. One large, planted aviary contains birds of paradise. The space between the towers in which are several of the hotel's restaurants is converted into an enclosure, beautifully planted with tropical flowering plants, bamboo, etc. which contains Victoria Crowned Pigeons and many exotic softbills.

'I was particularly impressed by the excellent condition of all of the birds. The macaws and cockatoos were immaculate with hardly a feather out of place in contrast to those which one sees too often in zoos and bird

gardens in Britain. The standard of hygiene was high and the aviaries were obviously thoroughly cleaned and food replaced in spotless containers early every morning. I can recommend thoroughly a stop-off in Bangkok at this delightful hotel for any aviculturist travelling to Australia.'

* * *

Fred Barnicoat, a Vice President of the Society, writes from South Africa:

'The South African National Championship Show for 1988 was staged in Durban during July. With its warm, subtropical climate this attractive venue drew exhibitors from all over South Africa. Mr. Brian Binns was brought out from England to judge the Zebra Finches, and this event was one of the main highlights of the show. The exhibition of Zebra Finches has shown rapid strides in South Africa in recent years, and good stock has been imported from the U.K. Also the availability of many of the new mutations from the Continent, such as the Black-breasted, Orange-breasted, Light-backed, Phaeo and Isabel has greatly stimulated interest. Nearly three and a half thousand birds were on show, of which almost 900 were wild birds and many rarities were to be seen. The supreme award was given to an immaculate Black-bellied Firefinch *Lagonosticta rara* owned by M. Wills. The medal for the rare breeding of the year was awarded at the Conference, and was won by Dr. W.D. Russell for breeding the Jardine's Parrot *Poicephalus gulielmi*.'

* * *

From Neville Brickell (Avicultural Research Unit, South Africa):

'In my article "The Lemon-breasted Canary *Serinus citrinipectus*" (Vol. 89, No. 3, pp. 159-160), I stated that in South Africa it extended as far south as Stanger in the province of Natal. It was later found that the two observations recorded from this area were escapees when thieves broke into an aviary in the area. They were extremely tame and subsequently caught. This species southernmost limit at present is the Umfolozi Game Reserve in Zululand.'

* * *

The World Pheasant Association is organising the 4th International Pheasant Symposium from 9th to 11th October 1989, near Beijing, China. Twenty-six of the 48 species of pheasant in the world can be found in China and Chinese field workers and scientists will be presenting papers on

many of them.

The WPA are also arranging a number of optional post-symposium tours, including a visit to the world-famous Panda Sanctuary at Wolong which is also home to six pheasant species.

Details of the China Symposium are available from: Jane Skelton, WPA China Symposium, c/o Trade Coaters Ltd., 34 Mead Lane, Chertsey, Surrey, England.

* * *

The Royal Australian Ornithologists' Union have published a conservation statement by John Martindale on the Freckled Duck *Stictonetta naevosa* which is illustrated by some fine coloured photographs.

The Freckled Duck is one of Australia's, and the world's, rarest ducks. It occurs mainly in the eastern, south-eastern and south-western parts of mainland Australia but, even now, the areas in which it breeds are not completely known. The data which is available so far suggests that it may have specific requirements for its breeding habitat.

The Freckled Duck appears to feed mainly on crustaceans and aquatic plants, but little else is known about its ecology. Surveys undertaken during the 1983 drought indicate that a relatively small number of permanent wetlands provide vital refuges for Freckled Ducks when their other habitats dry out during prolonged droughts. While in these refuges, this protected species is particularly vulnerable to illegal shooting.

Conservation of the Freckled Duck requires protection of its breeding habitat and of its drought refuges, as well as special measures during droughts to prevent illegal shooting of large numbers. Research is needed to define fully its breeding range and breeding habitat requirements. Dietary and other ecological data are also needed.

This booklet (RAOU Report No. 22 - ISSN 0812-8014) is published by the RAOU, 21 Gladstone Street, Moonee Ponds, Victoria 3039, Australia.

M.H.

* * *

AVICULTURAL SOCIETY NEWS

Social Events

A very enjoyable Garden Party was given by our President, Miss Ruth Ezra, and Vice-President, Mr. Raymond Sawyer, on Sunday 6th June, at Chestnut Lodge, Cobham. A full account may be found on page 170 of this issue.

A successful Dinner was held on Saturday, 9th July, at Duke of Yorks Headquarters, Chelsea. Seventy-five members and guests took part and we have been asked to repeat it next year when we hope that more members will be encouraged to come. After an excellent dinner speeches were kept short and were generally light-hearted. Amongst the speakers was Mr. Brian Byles, Editor of *Cage and Aviary Birds*, who recalled the role that the Avicultural Society and particularly the *Avicultural Magazine* had played in the past and asked members to give very careful consideration to the future of aviculture.

The evening finished with dancing for the energetic and a very good raffle that raised over £85 for the Society's funds. Those who wished to talk were not disturbed by the music as the premises are large and the volume was kept very low. The Headquarters Club at the Duke of Yorks Headquarters, Kings Road, Chelsea, has the great advantage of private, guarded parking in the centre of London and the caterer's charges must be the most reasonable one could find.

Our especial thanks are due to Mrs. Peggy Winsor for rallying so much support, to Mr. Ken Lawrence for being such an excellent Master of Ceremonies, to those who brought flower arrangements for the tables and raffle prizes, and generally to all the members who supported the event and helped to make it such a success.

On Saturday, 6th August, 80 members and guests visited Leeds Castle, Maidstone, Kent, at the invitation of the directors and the Curator of Birds, Mr. David Frank.

The party was given a conducted tour of the magnificent new aviaries that have been built in the lovely grounds of the Castle and admired the many interesting and innovative design features. A full account of these aviaries will be published in the next issue of the Magazine.

In view of the heatwave some members opted for a picnic lunch but those who went to the restaurant praised it highly. We were then free to tour the Castle and grounds until 3.30 p.m. when we all gathered in the cool of the Gatehouse Tower for a lavish cream tea. We would like to

thank David Frank and his Head Keeper, Keith Mitchell, very much indeed for giving up their time to give us such a wonderful day and to thank the directors of Leeds Castle Foundation for their generous hospitality. I am sure that everyone who came that day was most impressed by what has already been achieved and will look forward to seeing further developments.

The next social meeting will be held on Saturday, 15th October, at Warren Hill, Hartley Wintney. It will be a buffet lunch, followed by a lecture and tea. Details will be circulated separately.

The demand for tickets both for the President's Garden Party and the visit to Leeds Castle greatly exceeded the number available and quite a few members had to be disappointed. This was a great pity, of course, but unavoidable and, in fact, the main reason for this increase is a welcome one, i.e. the many new English members that we are recruiting at present.

On both occasions tickets were allocated strictly on a 'first-come, first-served' basis and we will continue to adhere to this in the future. If we are invited by someone who can only take so many people, then the alternative to this is to refuse their kind invitation. We still have our spring and autumn social meetings where all can come and be sure to meet their friends - though mostly the complaints came from people who do not come to these ordinary meetings.

Proof Reading

Since John Yealland died in 1983, the bird artist Richard Daniel has read the proofs of the *Avicultural Magazine* with meticulous attention to detail. Initially he volunteered to fill the gap 'until someone else could be found, just to help out', but he became indispensable. Now, having achieved a new studio, with ideal conditions, Richard wants to devote himself full-time to bird painting and has asked to be replaced. We are so grateful to him for all his hours of painstaking checking and wish him well with his painting.

We are also very grateful to David Coles who continues to read the proofs to check the avicultural content and suggests many useful amendments. What we now need is a proof-reader with a general knowledge and interest in birds but particularly a very sharp eye for mistakes in spelling, grammar, punctuation and printing errors generally. There is no fee for this work, I am afraid, but the deep gratitude of the Editor for helping to keep the Magazine to its present high standard. A volunteer is needed now and urgently please!

First breeding claim

As described in Volume 94, Nos. 1/2, page 83, Mrs. Rosemary Wiseman bred the Desmarest's Fig Parrot *Psittaculirostris desmarestii* in 1984 and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or of any other reason that would disqualify this claim, is asked to contact the Hon. Secretary.

Foreign Bird Federation Breeding Census

We now have a copy of the Census prepared for the years 1984-1987 by the Foreign Bird Federation and if any member would like a copy, please apply to me with a stamped, addressed envelope and £2.00 to cover the cost of photocopying.

The Avicultural Society is affiliated to the Foreign Bird Federation and committed to supporting this project. Inserted with this issue of the *Avicultural Magazine* is the form for the 1988 Census. We do appeal to British members to support this important project because the more breedings that are recorded, the better will be the picture of aviculture portrayed to the public generally. Information will be treated with absolute confidentiality and the form can be returned anonymously if required. Any correspondence or enquiries concerning this Census please send to Mr. R.E. Oxley, 2 Suttons Avenue, Hornchurch, Essex RM12 4LF.

Hon. Secretary

The Editor does not accept responsibility for opinions expressed in articles, notes, reviews or correspondence

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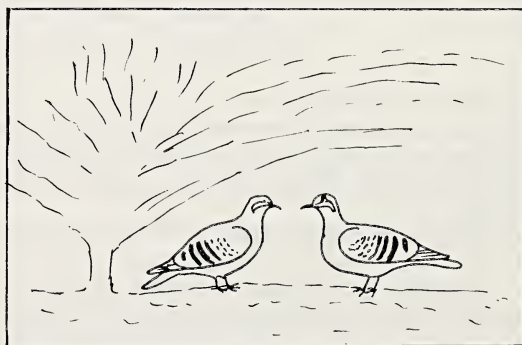
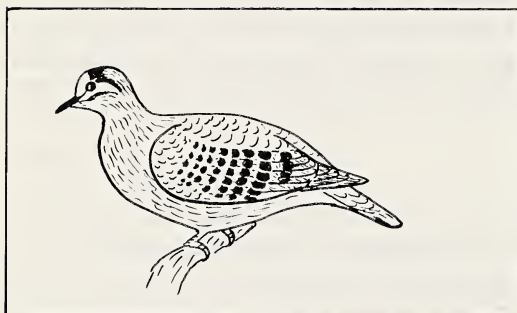
THE AVICULTURAL SOCIETY OF QUEENSLAND welcomes new members. An Australian Society catering for all birds both in captivity and in the wild. We put out a 52-page bi-monthly magazine on all aspects of aviculture and conservation. For membership details, please contact The Secretary, Avicultural Society of Queensland Inc., 45 Carwoola Street, Bardon West 4065, Queensland, Australia. Annual subscription (Australian dollars) Air Mail 30.00 plus 2.00 joining fee.

AVICULTURAL MAGAZINE back numbers. Large stock available including some early issues. Sales by post only. Price list available from the Hon. Secretary, Avicultural Society, Warren Hill, Hulford's Lane, Hartley Wintney, Hants. RG27 8AG.

AUTHORS AND PUBLISHERS are welcome to contact Neville Brickell (Avicultural Research Unit, 100 Innes Road, Durban 4001, Natal, South Africa) for data or photographs of Southern African birds for publication.

CORRECTION

We very much regret that owing to a printing error Derek Goodwin's drawings were omitted from his article, 'The Common Bronzewing Pigeon' in the last issue of the Magazine (Vol. 94, Nos. 1/2, pp. 92-95).



Common Bronzewings: (left) Male perched. (right) Pair under shrub.

Also omitted was part of the description on page 92; third paragraph, line eight should read: '.....mauvish pink, shading to pale brownish grey on the ventral area. The upper parts are mostly dull brown with pale rufous to pale buff edges to most feathers,'.

We do apologise most sincerely to Derek for these omissions, and hope that this lapse will not deter him from continuing to contribute his witty and erudite articles to the Magazine.

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The subscription rate for non-members is: British Isles £11.00; Overseas - £12.00 (30 U.S. dollars).

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AVICULTURAL MAGAZINE



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THE AVICULTURAL MAGAZINE welcomes original articles that have not been published elsewhere and that essentially concern the aviculture of a particular bird or group of birds, or that describe their natural history. Articles should be preferably typewritten, with double spacing, and the scientific names as well as the vernacular names of birds should be given. References cited in the text should be listed at the end of the article. Line drawings should be in Indian ink on thick paper or card; black and white photographs which illustrate a particular point in the article will be used where possible and should be clearly captioned. If authors wish their eventual return, they must say so when submitting the article and write their name on the back of each photograph.

ADDRESS OF EDITOR

Mary Harvey, Honorary Editor, The Avicultural Magazine, Warren Hill, Hulford's Lane, Hartley Wintney, Hampshire RG27 8AG, England.



Nestling Crimson-rumped Toucanet at Padstow Bird Gardens

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1988

HAND-REARING THE CRIMSON-RUMPED TOUCANET

Aulacorhynchus haematopygus

AT PADSTOW BIRD GARDENS, CORNWALL

By RICHARD HUGHES
(Formerly Head Keeper)

The Crimson-rumped Toucanet, one of the smaller members of the toucan family, is widely distributed in north-western South America, from Venezuela to the subtropical zones of Ecuador.

This species' most distinctive features are its blood red rump and chestnut beak (hence the alternative name Chestnut-billed Toucanet), which has a broad white stripe at the base. The beak is about $3\frac{1}{2}$ -4 in (0.09-0.10m) long, with the male's beak often slightly longer than the female's. The body plumage is mainly green, with a blue tinge across the breast; the tail is green with a chestnut tip. There is a maroon orbital ring around the eyes. The legs and feet are grey. This species measures overall about 15 in long (0.38 m), with the male usually larger than the female.

Our pair are housed in an outside aviary, in a corner formed by two Cornish stone walls. The aviary measures approximately 4 x 3.5m and is 3m high at the back, sloping down to 2.5m at the front. The floor is mainly grass with an earth border and earth beneath the perches to aid cleaning. The aviary is planted with several bushes of Himalayan Honey-suckle *Leycesteria formosa* (the berries of which are enjoyed by the birds) and one of the walls is covered with ivy. There is a hollowed out log in the corner formed by the two stone walls and two nesting holes in the wall.

The toucanets' diet consists mainly of apple, with soaked raisins, banana and orange. They also receive other fruits when in season. In addition they are given our own insectivorous mix. Livefood is offered occasionally, although usually it is not eaten. All food is liberally sprinkled with Vionate multi-vitamin powder.

In 1982 two young were reared and Padstow Bird Gardens was awarded the Avicultural Society's Certificate of Merit for the first captive breeding of this species in Britain (Evans and Coles, 1982). Since then the Crimson-rumped Toucanet has bred here on a number of occasions - two young were reared in 1984, three in 1985 and one in 1987. The parents were not always the same two birds.

The chicks are reared usually by the female only, as the male becomes aggressive shortly after the chicks have hatched. He is, therefore, removed to a holding flight and not returned until the chicks are weaned and removed from the aviary.

After the 1985 breeding season, just before we planned to return the male to the aviary, we found him dead on the floor of the holding flight. He had a broken neck and obviously had been disturbed during the night, probably by a cat.

Eventually, after a long search we acquired a newly-imported bird. This arrived on 23rd June 1986. It was in excellent condition and so, after a couple of days of isolation it was put into the aviary with the female. She attacked him immediately and, therefore, was removed to a holding flight to allow the male to settle into his new environment. Several days later the female was re-introduced and minutes later again began chasing the male.

Both birds were caught and placed in adjoining holding flights, which allowed them to see each other without actually being in direct contact. Some weeks later a partition was removed from between the two flights and the birds allowed in together. No more fighting occurred, so a week later both birds were returned to the aviary. By that time it was mid-August, too late for any nesting that season, but in plenty of time to settle down for the next.

First signs of nesting activity were seen on 24th February 1987 when both birds began chipping at the entrance hole in the log. On inspection, however, we discovered there was a large hole in the far side, obviously made by the female when she was last sitting.

On 3rd March the female was seen entering one of the holes in the wall of the aviary. Both birds continued to enter this hole, although it seemed as though somehow it was not really to their satisfaction.

On 24th March a new nesting log was acquired and the old one replaced. As soon as we left the aviary, both birds began looking into the hole and chipping around it. The next day there were many chippings on the ground beneath the log and during the afternoon the female was seen emerging from the entrance hole. Both birds continued going in and out and chipping away, until 13th April onwards, when at least one remained inside the log. It seemed as though incubation had started.

On 3rd May small pieces of white eggshell were found on the ground. The male was observed carrying food into the log, although no sounds could be heard coming from inside. On 15th May both birds were seen away from the nest and on inspection it was found to be empty.

On 31st May both birds again began spending much time in the log and five days later, whilst they were feeding, a quick inspection revealed three eggs. Incubation was shared by both birds, although the male spent less time inside; he would feed the female. On 18th June, after approximately 17 days' incubation, the male became very active and hunted on the ground for snails, earthworms, etc. Faint squeaks could be heard coming from the log.

Additional food was given in the form of crickets, mealworms (most of which were ignored) and more fruit, such as tomatoes, grapes, pears, plums and peaches. What they seemed to show most interest in was snails and these we collected from the many dry stone walls in this area.

All went well with the chicks' cries becoming louder and both parents industriously feeding them. That was until 1st July, when that morning the female was found sitting on the edge of the pond, looking decidedly ill and drinking a lot of water. As it was a warm, sunny day, it was decided to leave her outside, to save her the stress of being moved to different surroundings. We called the veterinarian who gave the female multi-vitamin and antibiotic injections. He did not hold out much hope and indeed by late afternoon her condition had deteriorated rapidly and she died. The post-mortem revealed the cause of death as acute enteritis and she also had a degree of gout. Kidney failure apparently was caused by a batch of bad fish meal that we had put into the insectivorous mix (since then fish meal has not been used).

We then had to decide what to do about the chicks. Due to the male's past unfavourable behaviour towards the female when the chicks hatched, we did not know whether to leave them with him to rear or remove the chicks and attempt to hand-rear them. We decided on the latter. It was not an easy decision to make, for as far as we know, at that time nobody in this country had hand-reared any sort of toucan.

Two chicks were taken from the nest (there was no sign of the third egg or another chick). The chicks were quite large and fleshy. They had no down, although at that time (two weeks old) pin feathers were appearing in places. The chicks looked rather reptilian. Their eyes were not yet open.

The chicks were placed on a layer of wood shavings covered with kitchen-roll paper, put in a cut-down ice-cream tub. This was placed in our incubator, set at 93°F (33.9°C). To simulate the darkness inside the log, a cloth was put over the lid of the incubator.

We (Simon Hunt, the other keeper, and I) decided that although the

parents would give the young some animal protein, their main diet would be fruit. The diet would be the same as we give to touraco chicks, but with the addition of Beef and Bone Broth baby food.

The diet consisted of:

- 3 teaspoons Cow and Gate Fruit Delight baby food
- 3 " Cow and Gate Beef and Bone Broth baby food
- 1-2 " natural yoghurt
- 2 " Farley's Breakfast Time
- 1 calcium and lactate tablet (crushed)
- Small pinch Vionate vitamin and mineral supplement

This was all mixed together with a few drops of water and fed to the chicks through a small syringe, with rubber valve tubing attached to the nozzle. They were fed every 1½ hrs, with only small quantities of food, i.e. 1½-2 mls, which they took readily.

The following notes come from our breeding records made at the time:

2nd July: The chicks seem to be doing fine. They were fed every two hours throughout the night and are now being fed every two hours through the day. One chick is slightly larger than the other - they weigh 84g and 76g. When they are fed they take a small quantity of food, swallow it and then lick around the edges of their beaks with their reptile-like tongues, only then will they take more food. Feeding, therefore, is a very laborious task.

When the lid of the incubator is removed at feeding time, they respond immediately by gaping violently and, if a finger is offered, will lunge upwards and take a good half of it down their throat. We have noticed that they appear to have no crop, at least not a visible one. Therefore, we have no visual means of knowing when they have had enough food. This does not appear to be an immediate problem, because as soon as they have had enough they flatly refuse any more.

3rd July: Both chicks appear alright. Both weigh 79g, therefore the larger one has lost 5g; however, he looks quite healthy. When the chicks are sleeping, they sit with their heads thrown backwards over their back. They have pads on their 'hocks' which they use when feeding, probably to make themselves more upright in the nest, and they will sit back on them.

4th July: The smaller of the two chicks is not gaping properly; we are having to force-feed it. Its weight has dropped from 79g to 64g. The other chick's weight has increased to 82g.

5th July: The smaller chick would not swallow food and died this morning. The other seems fine.

6th July: The remaining chick's pin feathers are growing longer.

7th July: Its eyes are beginning to open slightly and its pin feathers

are definitely protruding more. Its breathing seems a bit heavier than usual and it is sneezing occasionally. However, there is nothing wrong with its appetite and it is now being fed about 12ml of food every two hours. The incubator temperature is now 92°F (33.3°C).

8th July: The chick was seen preening its breast. Its breathing remains heavy and it is sneezing still. We decided to give it a course of Rovamycin (antibiotic), a pinch of which was put into one of its feeds.

10th July: Treatment continuing.

11th July: Exercising its wings. Feathers are now opening at the ends of the quills.

13th July: Small, red worms found in its droppings. They are identified as belonging to the genus *Cyathostoma*, which apparently are very similar to *Syngamus* (gapeworm) and have not been reported in toucans or toucanets. All the symptoms, sneezing, heavy breathing, gaping, etc., which we believed to be a chill, apply also to this worm infection. We treated the chick with Nilverm. The bird weighs 114g, so we gave it 1.1ml (1ml per 100g). There has been no loss of appetite.

14th July: Not much change in its condition. From looking at it, the bird does not appear to be critical. Saw it stretching and scratching its head with its foot. Found one worm in its droppings.

15th July: He seems very active. We have not found any more worms.

20th July: The feathers on the wings are doing very well; they are almost completely open. The head too is almost completely covered, although the quills are still evident. The back is now covered in long quills, as is the front.

24th July: We may soon stop weighing him, as this seems to cause a great deal of stress.

26th July: No further weight recordings will be taken. The incubator is now at its lowest setting, i.e. approximately 88°F (31.1°C). We will lower this by raising the lid. Solid food, including diced bananas, grapes, peaches, and raisins, as well as the mix, are now being fed to the bird.

28th July: During the day we switched off the incubator, without the bird showing any apparent ill effects. We will switch it on again at night, in case it suddenly turns cold.

29th July: More worms have been found in the chick's droppings. We collected some fresh wormer, as the other was about a year old and may not be as effective as it could be. This morning the chick looked very ill before it was wormed, but had perked up considerably by this evening.

31st July: The chick looks a lot better today. The quills on the back and breast are about half open. Now it really looks like a toucanet.

2nd August: Moved him into a box-type cage. Tonight we will place him back in the incubator, but not turn it on. He is being fed entirely on

solids, which are pushed down into his throat. Any food placed in the beak is discarded.

3rd August: The chick really seems to like it in the cage. He seems to enjoy it so much that we have decided to leave him in it overnight.

4th August: The chick is constantly hungry and whenever it sees one of us, it starts croaking. I feel that it is heavily imprinted and may be no use for breeding purposes.

11th August: All its feathers have opened fully. It is now green all over and its beak has begun to change from black to chestnut, though at the moment this is only slightly noticeable. Its tail is still quite short, probably about an inch long.

15th August: Will now eat food placed in its beak. It will toss the food about until it has manoeuvred it into the correct position, then with a few violent head jerking movements, will swallow the food.

17th August: A film crew came and I took the chick up to the centre lawn to be filmed. It was a very hot day. While we were outside the chick spent the whole time (about half an hour) sunbathing, which we thought was very good, as he had never before been out in the sun. However, about an hour after being returned to his cage, he began having fits. He looked very ill and as though at any moment he might die. After consulting Arnall and Keymer (1975), we decided that he must be suffering from heat stroke. In an effort to bring down his temperature, we began spraying him with cold water. We did this regularly. By evening he seemed to have perked up a little and was again taking food. At about 7.30 p.m., he had another fit but after being sprayed, soon settled down.

18th August: We continue to spray him every now and again. He seems a lot better.

23rd August: Seems fine again. We hold a bowl of mixed fruit in front of him and if we wait long enough, he will begin to pick up pieces and eat them. His interest though, is soon lost, so we are coming in more often in an effort to get him feeding himself.

25th August: We are now putting him out into a shed during the day and bringing him in at night. He can fly quite well, back and forwards the length (approximately 3m) of the shed. His lower mandible is developing a white patch at the base and the rest of the beak is almost totally chestnut. We are going in to feed him every 1½ hrs.

31st August: Because he is so tame, whenever we go in, he flies on to us. Left him all afternoon without a feeding and when we went in at about 5.00 p.m., he had eaten the contents of a small bowl of fruit.

1st September: Fed him early in the morning before we put him out and left him to his own devices for the rest of the day. He seems fine and has eaten quite a lot of food. We are still bringing him in at night.

3rd September: We did not need to hand-feed him at all today. It actually looks as though he is weaned. He is now about 11 weeks old.

10th September: Left him out all last night and he was fine this morning. He is doing very well and enjoys bathing.

6th November: We now believe that 'he' is a 'she', as she still has a short beak.

Conclusion

With hindsight we believe that the male would have cared for the chicks for he called incessantly and carried food to the nest log for several weeks after the young were removed. However, as one chick was infected with worms, we feel that it probably would not have survived, had it been left with the male. A post mortem was not performed on the chick that died, which may also have been infected with worms. We are reasonably sure that the source of this infection was snails given to the adults, as snails would carry the worm eggs. Therefore, it seems as though we probably made the correct decision, for at least we managed to rear one of the two chicks.

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TABLE 1: Weight gain of surviving Crimson-rumped Toucanet chick

July	5 - 88g	16 - 125
	6 - 85	17 - 129
	7 - 89	18 - 134
	8 - 89	19 - 137
	9 - 102	20 - 140
	11 - 114	21 - 141
	12 - 116	22 - 146
	13 - 114	23 - 148
	14 - 120	24 - 151
	15 - 120	25 - 151

BREEDING AND BEHAVIOUR OF THE BLUE AND WHITE FLYCATCHER *Cyanoptila cyanomelana*

By JEFFREY TROLLOPE
(Middlesex)

Introduction

This beautiful Old World flycatcher has occasionally been listed in *Ficedula* or *Muscicapa* by some taxonomists. Walters (1980) merged the monotypic *Cyanoptila* and *Ficedula* into *Muscicapa*. He comments that the arrangement of the family is complicated, and that no authoritative list exists.

For some years I considered *cyanomelana* as a breeding prospect; attracted by their elegance, activity and, an advantage to the aviculturist, their sexual dimorphism. In June 1986 I was able to purchase a pair in good condition, and consulted the somewhat limited avicultural literature on the family.

Description

Approximately 7 in (0.18m). Male: bill black; irides dark brown; crown cobalt blue; mantle, rump and upper tail-coverts dark blue, lightly marked with black streaks; sides of head, throat and breast black; rest of underparts white; legs and feet dark grey.

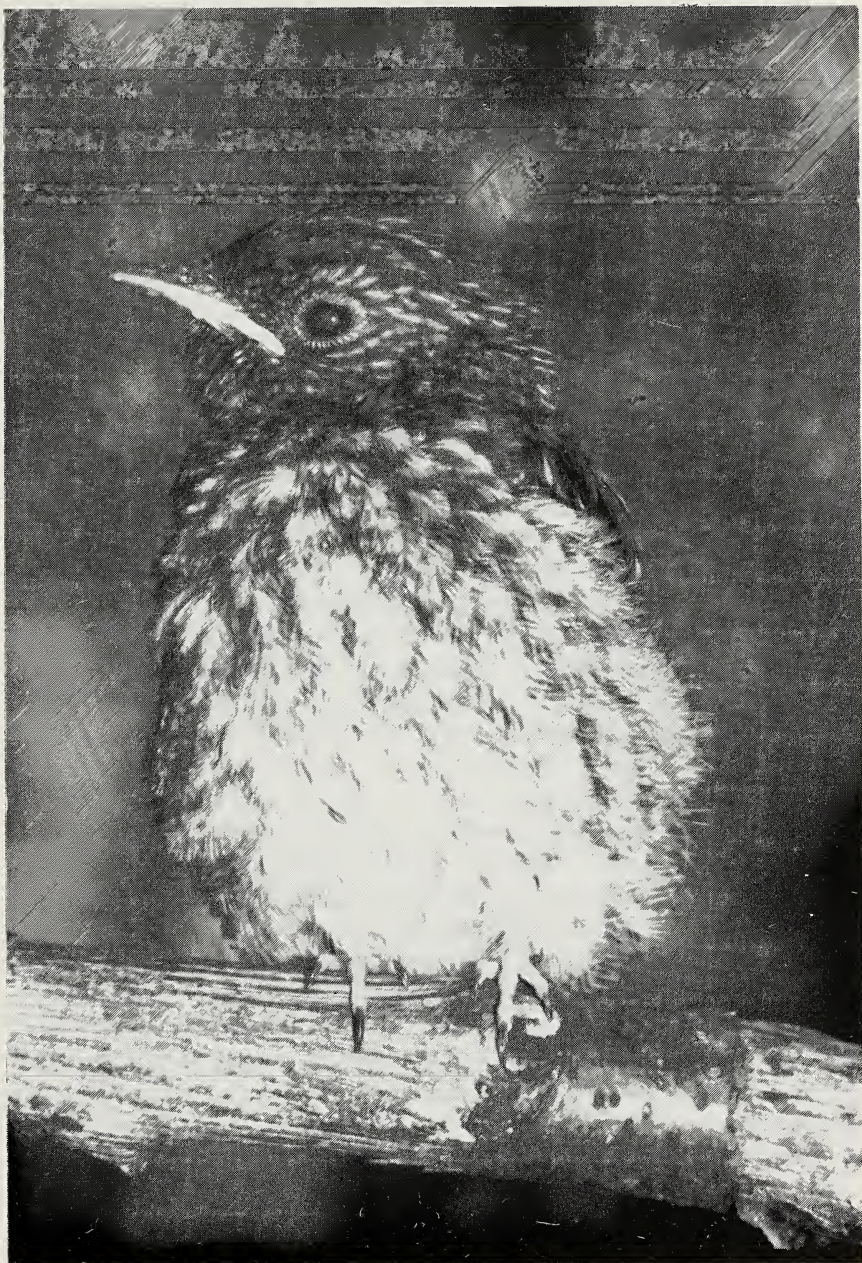
Female: Bill black; irides dark brown; upperparts greyish olive brown; underparts greyish brown; throat, centre of breast and abdomen dull white; undertail-coverts white; legs and feet dark grey.

Distribution and habitat

North and eastern Asia, southern Burma and Thailand, Philippine Islands, Borneo, Japan. Mixed and deciduous forest, rocky areas, often near streams.

Housing, food and feeding

Between April and November the birds are housed in an aviary (No. 1) measuring 3.1 x 1.1 x 2.4m high (10 x 3.5 x 8 ft high). During the winter they are housed in an outside bird room, maintained at a temperature range of 8-12°C (45-55°F) with an extended day, provided by electric light until 20.00 hrs. The basic diet consists of Claus softbill mixtures (fine grade and coarse), mealworms and mealworm beetles. When breeding this was supplemented with house crickets dusted with Vionate and live food collected from nettle beds and bushes.



Blue and White Flycatcher, 14 days old

Martin Trollope

The adult birds readily ate the dried fruit in the coarse omnivorous softbill mixture, beside the mealworm beetles. It is interesting to note that Smythies (1981) records that *cyanomelana* specimens collected in Borneo were found to have been feeding on berries, often green and hard. Beetles and bees were found fairly often. Smythies comments that they were seldom mixed with vegetable matter; specimens collected on the same day and from the same habitat, had taken either 100% plant or animal food.

Breeding

The adult pair was released into aviary No. 1 at the end of June 1986. They had a moult in mid-July. Their moult was completed by early August, both birds were very fit and they were returned to the bird room in November. In April 1987 they were released into the same aviary which had nesting receptacles among the cut conifer branches fixed to the sides. These included a wooden box with a half-open front, of the type used for Pied Flycatchers, fixed about 2m (6.5ft) above the ground. In June the female began to take dried grass stems and upholsterer's fibres to the box, and a nest of stems lined with fibres was completed. During this period, the male followed the female in rapid flights, sometimes touching her rump in flight. The female sat in the nest for brief periods during the day, but eggs were not laid and there was no further breeding activity in 1987. The pair was returned to the bird room in November.

First brood

In April 1988 they were released into the same aviary. On 3rd May the female was taking stems and fibres to the nest-box. The nest was completed within three days and both birds were flying around the aviary, the male chasing the female. The first of four eggs was laid on 8th May; the female began incubating on 11th May when the last egg was laid. The female was a close sitter, only coming off the nest to feed. The eggs were of a white ground colour, sparsely spotted, with pale reddish brown mostly at the larger end. On 23rd May, four chicks hatched; they were pink skinned with sparse grey down, the gape was a reddish pink, the gape flanges pale creamy white.

The female brooded the chicks closely for the first six days during this period, the male being largely responsible for feeding the chicks. The female fed the chicks when she came off the nest to drink or bathe. The chicks were fed on collected live food, caterpillars, moths and other flying insects, and beetles. The parents always fed this before feeding the mini mealworms, crickets and other commercially bred live food. The parents did not feed any softfood to the chicks, or eat any themselves, once the chicks had hatched.

The faecal sacs were removed by both parents and eaten.

The chicks left the nest on 5th June; they could fly up to perches and around the aviary. Their secondaries and primaries were nearly fully developed, although their tails were rudimentary. Their bills were greyish, with the gape flanges still pale creamy white at the base; the irides dark brown. The upperparts were brownish grey with spots of dark brown and yellowish buff, the secondaries and primaries were dark brown.

Second brood

On 6th June, the female repaired the same nest, and the first egg of the second clutch of four eggs was laid on 7th June. The female began incubation on the 10th, when the last egg was laid. On 12th June one chick of the first brood, which was noticeably smaller than its siblings, was found dead. The other three chicks thrived and were flying fast around the aviary. On the 18th they were seen feeding themselves. At this stage two of the chicks were showing a blue area on their tails, and black edges to feathers on the secondaries and primaries, also white lower abdomen and undertail-coverts. The third chick did not show these plumage changes except for the white areas.

On 21st June the chicks of the first brood were removed from the aviary to a bird room, and four chicks of the second brood hatched. They showed the same pattern of development as the first brood and left the nest on 4th July. Like the first brood, they could fly up to the perches on leaving the nest; two of the chicks were slightly smaller than their siblings. On 5th July the female was taking material to the same nest, and on 9th July the first of four eggs (third clutch) was laid; the female began incubating on 12th July when the last egg was laid.

By 16th July, the second brood were feeding themselves, their tails were nearly fully developed and they were showing white on the undertail-coverts. The three chicks of the first brood could now be sexed visually, the two males showing blue feathers on the secondaries, primaries and tail. The breast and lower abdomen of all three chicks were now pale greyish white. They had now been 'meated off' a continuous diet of live food on to commercial soft food. It is often overlooked that the young of insectivorous birds reared in captivity have to become accustomed to inanimate food, as did their imported parents.

Behaviour and voice

As in many species in the Muscicapidae, the song of the male is a low-toned series of warbling notes, inaudible at any distance. A *tic-tic* note is always accompanied by the tail being flicked up and down, often occurring when they are given live food, or if there is any disturbance.

When a cat is sighted, both adults give a high pitched, four-note call until the cat is out of vision. The food-soliciting call of the chicks, *zeep-zeep-zeep*, could be heard from about 10 days after hatching.

Courtship flights around the aviary were performed with amazing speed and timing in such a small area. The male would often twist down in a loop, when almost touching the roof. On one occasion the male was chasing the female, who alighted on the ground, turning to face the male as he landed near her. He swung his head from side to side, singing and flirting his wings and tail, the female flew up to a perch, the male following, and copulation took place. Although they hawked for flying insects, they would often take live food from the ground. Nesting material was always taken from the ground, although it was available from various sites and heights in the aviary. As with other species in the family, the adults were very tolerant of nest inspection at all stages of reproduction.

ACKNOWLEDGEMENT

My thanks to Martin Trollope for taking the photographs.

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As described above, the Blue and White Flycatcher *Cyanoptila cyanomelana* has been bred by Mr. J. Trollope and this is believed to be the first success in this country. Anyone knowing of a previous breeding in Great Britain or Northern Ireland, or of any other reason that would disqualify this claim, is asked to inform the Hon. Secretary.

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BREEDING COBALT-WINGED PARRAKEETS

Brotogeris cyanoptera

By C. SCOTT

(Lynton, Devon)

The Cobalt-winged Parakeet is mainly green in colour, almost iridescent on the back of the head and nape. The forehead is yellow which seems to be brighter and more extensive in the cocks. The crown is tinged with blue, again more so in the cocks. The bill is horn-coloured, and there is an orange chin spot. The primary and secondary feathers are bright cobalt blue and these give the birds their name, although little of this blue can be seen when the wings are folded.

There are three subspecies: the nominate *Brotogeris cyanoptera cyanoptera*, to which my birds belong, has the largest distribution, being found in Brazil, southern Venezuela, Colombia, Ecuador and eastern Peru. *B.c. gustavi* differs in having the edge of the wing yellow and slightly less blue on the wing; this is only found in a small area of northern Peru. The other subspecies *B.c. beniensis* resembles *gustavi* but is found only in northern Bolivia.

I purchased my original pair from a local pet shop, and installed them in a 2 x 1 x 2m high indoor aviary. They were in quite good condition considering that they had been fed a very sparse diet of sunflower seed and the occasional grape. This was in 1981 but it was not until 1985 that I saw this species for sale again, in the shape of four hand-reared chicks bred by Mr. and Mrs. P. Clark. These were the first to be bred in Britain (*Avicultural Magazine*, Vol. 92, No. 3: 124). I kept them separate from my adult pair in a cage 4 x 2ft square (1.22 x 0.61m square) although they were let out to fly around the birdroom whilst I was feeding the other birds. By replacing their replenished food dish it was a simple matter to get them to return to their cage.

The following year (1986) I obtained another three young birds from the same source and all nine birds were placed in an indoor flight 2 x 1 x 2m high, in my new birdroom. After some initial bickering, all the birds got on well together. Five nest-boxes were in place before they were installed: two measured 7in square by 12in high (0.14m square x 0.24m high) and the other three were 5½in square by 10 in high (0.14m square x 0.25m high). All the boxes were at the same height and all had 2 in (0.04m) entrance holes. After two weeks, eight of the nine birds were roosting in one box, only the original cock staying out. In the five years in which I had the original pair on their own, the cock never once entered a nest-box.

On 15th March 1987, mating was observed between one of the 1985 cocks and the original hen. On 20th March she laid her first egg in one of the larger boxes. She then laid an egg every other day and started incubating from the second egg. The nest was inspected on 29th March as the hen was out. The box contained five cold eggs so they were removed to an incubator. After 10 days in the incubator, the eggs were candled to reveal four fertile eggs and one clear one. On the 14th day of incubation we had a power failure and the four eggs failed to hatch.

By the middle of May the same pair were seen mating and feeding each other, but the same cock was also seen to be feeding and mating with one of his sisters. On the 29th the original hen had laid an egg. Two days later she laid her second egg, and the young hen laid her first in an adjacent box. Both hens were sitting by 2nd June but the next day the young hen was seen leaving the older hen's box. By the 5th I realised that both hens were sitting in the same box. The two eggs laid by the young hen in her own box were removed to an incubator but proved to be infertile. Meanwhile, the two hens continued to sit together on six eggs. Nest inspection on the 29th revealed two chicks and a third hatched the next day. The other three eggs failed to hatch and were removed; one was dead in shell and the other two were clear. On 14th July I ringed the two younger chicks, the oldest chick being too large to fit the size 'N' ring. Everything went well with both hens and the cock feeding the chicks, and on 16th August, approximately seven weeks after hatching, the first chick left the nest-box, the other two followed the next day. After the three chicks had left the box, the colony became very noisy with the three parents becoming aggressive towards the original cock, so he was removed from the aviary, although they did not show any aggression towards the other inmates.

As the birds were kept indoors with extended daylight, they started their second round in December. Two young hens sharing one box laid a total of 12 eggs, none of which hatched, four being 'dead in shell', three were addled and five were clear.

Meanwhile, the original hen had laid five eggs, all of which hatched, the first on 18th January, and the others hatching within two days. All went well for the next ten days until nest inspection on 2nd February revealed what appeared to be a massacre. The chicks were cold and spread around the box the inside of which was covered in blood. The chicks were covered in bites and all showed severe bruising. The five chicks were removed and placed in an incubator; the two youngest died within the hour but the other three were hand-reared.

By April the same hen was again on five eggs although only two hatched, two being 'dead in shell' and one clear. These two chicks were



Three Cobalt-winged Parrakeet chicks, aged approximately six weeks,
with two Dusky-headed Conures, approximately four weeks old

C. Scott

reared for 10 days when one showed a small bite mark on its back so they too were removed immediately for hand-rearing.

* * *

BREEDING THE EUROPEAN GREY OR COMMON CRANE

Grus grus grus

AT STAGSDEN BIRD GARDENS (Bedford)

By RODNEY RAYMENT
(Owner)

In the spring of 1983, whilst visiting a local dealer, I noticed a particularly fine specimen of European Grey, or Common Crane which was calling continuously and looked very fit. The bird was then thought to be a male, but later turned out to be a female and had, apparently, originally been in a private collection in Buckinghamshire. After some negotiation, I managed to acquire the crane, in exchange for some other birds. I already knew of another single bird of the same species which I acquired, again in exchange for other birds.

The new arrivals were introduced into a large pen, approximately 10,000 square feet in area, with a shallow pool and some trees for shade. At this stage the birds were unsexed, but as they got on well together and duetted when calling (which is a good indication of a true pair of cranes) we decided to stick with what we had and not have them surgically sexed. The male, however, was surgically pinioned. There are so few representatives of this species of crane in this country that it would be unlikely that we would be able to exchange one, should they prove to be of the same sex.

No breeding activity was observed during the summer of 1983, although they often danced in display and called together. The male went through a heavy moult. During the spring of 1984, the intensity of calling and dancing increased and whilst thus engaged they often picked up pieces of grasses and tossed them up in the air. Early in May, I heard some softer calls coming from the pen and on investigation, saw the female crouching

for the male to mate with her, which he did, apparently quite successfully, thus disproving the theory that pinioned cranes cannot mate. On 26th May a large light brown egg, with dark brown blotches, about the size of a goose egg, was discovered next to the gate, at the front of the pen. There was no nest, except for a few pieces of grass. The female sat on the egg but left it if disturbed, both birds keeping a watchful eye on it from a distance. Two days later, on 28th May, a second egg was laid and as the nest site was liable to disturbance, being in the front of the pen, close to where visitors walked, it was decided to remove the eggs and place them under a broody bantam.

Courtship activity continued and mating was again observed. Exactly two weeks from the laying of the first egg, another egg was laid, this time in a far corner of the pen. Some sticks and grass had been gathered as an attempt at a nest. Two days later a second egg was laid. As the parents were very protective and sat well, it was decided to leave the eggs with them. The female sat most of the time but if she left the nest, the male took over. He was particularly aggressive and continually patrolled the perimeter of the pen, chasing away any other birds that came near. He was particularly aggressive towards peafowl and finally killed one bird, which was stupid enough to enter the pen.

Due to the dense nature of the eggshells, we could not candle the eggs to see if they were fertile, although it believe it is possible with a very strong light. However, the first clutch, under the bantam, looked promising and on 23rd June, after 28 days' incubation, the first egg to be laid was pipped. We anticipated a prolonged hatching and left the egg, under the bantam, until later on in the morning. However, as so often happens when breeding birds, at the moment of success disaster strikes and on inspection it was discovered that the chick had hatched and been killed by the bantam. This is one of the risks incurred by using bantam foster mothers instead of incubators, but overall I believe better results are obtained using the former. Careful selection of breeding stock can eliminate this trait. To avoid a repeat performance, the second egg was placed in a still-air hatching incubator set at 90°F. It was pipped the next day. After 24 hours it had made no further progress and so we decided to help it out of the egg by carefully chipping away pieces of shell and easing the chick's head out. This is a very delicate procedure and if done before the membranes are dry, can result in the chick bleeding to death. Also the chick must not be removed from the egg until the yolk sac is fully retracted.

After removal from the egg, the chick developed splayed legs - this sometimes occurs when hatching is delayed. To rectify this the legs were tied loosely together with fine string, which enabled the chick to stand

and after two days the string was removed and the chick walked normally.

It readily took chick-rearing crumbs from a moistened finger and was also given pieces of meat from day-old chicks. Its favourite was a 'clover cocktail' comprising of moistened chick crumbs, mixed with chopped clover and chick meat. After two or three days it picked up food itself and began to grow rapidly.

After seven days the young crane was pinioned. He was a delightful character, covered in ginger-coloured down, and he called excitedly on seeing his keeper, who continued to hand-feed him with the 'clover cocktails' to supplement his diet of chick crumbs. Because of his leg problems he was christened 'Crazylegs' and was the most appealing young bird we have ever hatched. At ten days he was allowed out on fine days and he would follow his keeper everywhere. We felt that it was important that he should have plenty of exercise in order to strengthen his legs, as in the wild he would walk considerable distances each day following his parents. Young hand-reared cranes often develop leg problems, which may be partly due to lack of exercise.

Meanwhile, the second clutch was still being incubated by the parents and after 28 days the first egg pipped and hatched very quickly, as did the first egg of the first clutch. We would have liked to have left it with the parents to rear, but felt it was too vulnerable and as the second egg had not yet pipped, the chick was removed for hand-rearing. He was much stronger than 'Crazylegs', stood up after 24 hours and started to feed himself immediately. The second egg pipped, but was slow to hatch, the female kept standing up and fussing over it, probably helping the chick out of the egg. When it finally emerged, we removed it for hand-rearing. As young cranes have a tendency to cannibalism (i.e. the stronger chick usually kills the weaker) they have to be kept separated for some time. If allowed to be together they fought savagely. On one occasion they accidentally got in together and the stronger chick badly pecked the head of the other but fortunately it recovered. The three young cranes consumed large quantities of rearing pellets, growing rapidly and gradually replacing their ginger down with grey feathers. At this stage they lived together quite happily. By September they were almost fully grown and were left outside at night. In a natural state they need to grow fast and achieve adult size by the end of the summer in order to be strong enough to migrate to their winter quarters with their parents. They still retained their juvenile cheeping calls until the spring, when their voices gradually broke and deeper bugling calls were included in their repertoire. The last of the ginger juvenile feathers on their heads were replaced with the familiar black and white head pattern and red patches began to appear on their bare, black crowns. At twelve months they were surgically sexed;

‘Crazylegs’, who was the larger, proved to be a male and the two from the second clutch were both females. These birds will probably be retained for future breeding stock.

We were successful again in rearing two young in 1985 and after our success in breeding East African Crowned Cranes, in 1984 and 1985, we are all very enthusiastic about cranes here at Stagsden and hope to establish breeding pairs of other species of cranes in the future.

This small family of birds, represented by 15 species, has very ancient origins but is now very threatened. As cranes require large tracts of undisturbed open country in which to breed and migrate long distances to their wintering grounds, they are very vulnerable and several species are now very rare. As cranes are comparatively easy to manage in captivity and breed quite readily, given the right conditions, it is very important to establish captive-bred stocks of these birds, so that if their breeding grounds were ever destroyed, they could be saved from extinction and possibly reintroduced, when conditions were favourable. It would be irresponsible if we were ever to allow these magnificent birds to disappear, so that future generations were unable to hear their strident bugling echoing across the last remnants of wilderness on our planet.

Previous notes in the Avicultural Magazine

1910: p.36. The Duchess of Bedford. Nesting results at Woburn.

1926:341. D. Seth Smith. Records of birds bred in captivity.

1933:99. Dr. E. Hopkinson. More additions to breeding records.

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THE ORANGE-BELLIED PARRAKEET

Neophema chrysogaster

By PROFESSOR J.R. HODGES

(Harrow, Middlesex)

The Orange-bellied Parrakeet is the rarest species of the genus *Neophema* and is probably very close to extinction. It has not been common since the beginning of this century and it is estimated that now there are less than two hundred individuals surviving. Orange-bellied Parrakeets breed from November to February in the coastal areas of south-western Tasmania. In March they commence their migration along the Tasmanian west coast to King Island in the Bass Straits, where they appear to congregate for a while before moving on to their overwintering habitat along the coast of south-western Victoria.

Loss of habitat is probably the main cause of the decline of this species for, although it breeds in one of the most inaccessible and uninhabited regions of Tasmania, it spends the winters in an area on which there is considerable pressure for industrial development.

Trapping for aviculture is also considered to be a reason for its near extinction. Although the species has been totally protected for many years, I saw several specimens in private aviaries in Adelaide in 1973 when Fred Lewitzka, who was then head keeper of birds at Adelaide Zoo, told me that he had pairs which were breeding in the aviaries at his home. Presumably the wildlife authorities became aware of those activities and, perhaps unwisely, insisted that the breeding stock should be released into the winter habitat.

During the Australian parrakeet 'boom' in the last decade several specimens reached Europe. They were bred successfully on one occasion each by two Dutch breeders but European aviculture has certainly done nothing to help with the conservation of this species.

In 1984 an attempt to save the Orange-bellied Parrakeet from certain extinction was initiated with the establishment of a 'recovery team' consisting of representatives of the Tasmanian and South Australian National Parks and Wildlife Services and the Royal Australasian Ornithologists Union. Plans have been devised for the protection of the breeding areas in Tasmania, the migratory route in Tasmania and King Island and the wintering areas in Victoria. One of the Wildlife Officers responsible for the implementation of the campaign in Tasmania is Peter Brown who, until he emigrated to Tasmania, was in charge of the Bird Gardens at Harewood House, near Leeds, and was a member of the Council of the Avicultural

Society. Although in recent years he has developed reservations about the ethics of aviculture and the part which it can play in conservation, his ambivalence has not prevented him from persuading the Tasmanian authorities to embark on a captive breeding programme. It is hoped to establish ten breeding pairs of Orange-bellied Parrakeets and it is intended to liberate their young birds at the appropriate time into the right environment.

Three years ago Peter took me to see the then newly established aviaries. They consisted of several well-sheltered compartments, each about 20 x 20 x 7 ft high (6.09 x 6.09 x 2.13m), with an elaborate, well designed service corridor. As a pilot experiment, each compartment contained four or five pairs of Blue-winged Parrakeets *N. chrysostoma* or a similar number of Rock Parrakeets *N. petrophila*. In their first season both species had produced between 20 and 30 young. These were to be used for the main object of the exercise which was to determine the optimal conditions for transfer to their natural habitat.

Having kept Blue-winged Grass Parrakeets in my aviaries for more than 20 years, during which my birds produced more than 200 young, I was not surprised that the Tasmanian captive stock was breeding so well. However, I could not disguise my excitement and surprise about the remarkable breeding success with the Rock Grass Parrakeet for this has been one of my favourite species ever since I had the good luck to obtain three about 20 years ago. Although they are duller coloured than the other members of the genus *Neophema*, they are the largest and boldest. Far from being 'fat and sluggish' and 'dull and uninteresting', as Lendon and Boosey described them, mine were active, lively and tame. The Rock Grass Parrakeet has bred successfully on a few occasions in aviaries in Australia but never, as far as I know, in Europe. In its natural habitat, along the coast of South Australia, it feeds on the seeds of grasses and, particularly, mesembryanthemum and it nests in rock crevices. In captivity it adapts quickly to an unnatural diet of 'parrakeet mixture' and nests in boxes. Although those in the Tasmanian aviaries were provided with rockeries, logs and conventional nest-boxes they seemed to prefer the boxes. Both the Rock Parrakeets and the Blue-wings continued, apparently, to breed consistently well in the aviaries of the Tasmanian Wildlife Division and their remarkable breeding success is attributed to the fact that they are kept in colonies rather than as separate pairs per aviary as is usual.

I went again with Peter Brown to the aviaries when I was in Hobart in March of this year (1988). The Blue-winged Parrakeets had been released and in their place were about 20 Orange-bellied Parrakeets. This was the first opportunity I had had to examine closely several of them together. They are considerably larger than Blue-wings and in size and shape resemble

Rock Parrakeets. The upper parts are a lovely rich grass-green which contrasts with the yellow of the chest and breast. The orange patch on the abdomen is much brighter and more well-defined than that often seen in Blue-winged or Elegant *N. elegans* Parrakeets. The birds were very active and quite tame.

Four young birds had been reared in 1986/87 and ten in 1987/88. However, it is not exactly a success story because the first young birds developed beak and feather syndrome and died. This syndrome, which may be identical with French moult, is caused by a viral infection which is normally transmitted to the young in the nest by the parents which may carry the disease without exhibiting any symptoms. Peter Brown, with the co-operation of the School of Veterinary Medicine, University of Western Australia, has been able to identify the birds carrying the disease. These have been isolated. For the time being, they will be encouraged to go to nest but their eggs will be placed under Rock Parrakeets which should make good foster parents of disease-free young. The uninfected birds will be allowed to rear their own young. It is hoped that eventually a disease-free breeding strain will be produced.

The Tasmanian Wildlife Services made extraordinary and ridiculous efforts to shroud in secrecy their resort to aviculture to help to save the species. However, the secret was revealed when three birds were stolen. Rumours were rife that the birds had been taken by an international parrot smuggling ring and would end up in the collection of a wealthy, uncaring American or European prepared to pay exorbitant sums for them. However, the thieves were caught and turned out to be a couple of local lads who thought their loot was a few budgerigars!

It will be interesting to see if aviculture will play a part in saving the Orange-bellied Parrakeet from extinction. The re-establishment of the species in the wild appears to present almost insurmountable problems since so much of the overwintering habitat is threatened by commercial interests. I believe that the efforts will be worthwhile if they succeed only in the establishment of an aviary-breeding strain of this lovely little bird - a view which, sadly, few conservationists will share.

Previous articles in the Avicultural Magazine:

1938: 213-219. J.F.M. Floyd, The Orange-bellied Grass Parrot

1940: 294-298. Alan Lendon, The Australian Grass Parrakeets.

1942: 32-38. Sydney Porter, Notes on the *Neophema* Parrakeets.

1950: 76-92. Alan Lendon, Australian Parrots in Captivity.

THE CRESTED PIGEON

Ocyphaps lophotes

By DEREK GOODWIN

(Petts Wood, Kent)

The Crested Pigeon or Crested Bronzewing is one of the Australian bronzewings. With the exception of the Common Bronzewing *Phaps chalcoptera* about which I wrote previously in our magazine, it is the most widespread and beautiful of them. Although its plumage is not, in my view, quite so lovely as that of the Common Bronzewing, it is still very beautiful and the Crested Pigeon is the most elegant of all the bronzewings in shape and in its lively yet graceful movements and postures. Though not so widespread as the Common Bronzewing it is usually more numerous, and certainly more easily observed, where it does occur.

In size it is somewhat larger than a Barbary Dove *Streptopelia roseogrisea* but smaller than all but the tiniest Domestic Pigeons (African Owls and Short-faced Almond Tumblers). It has, for a pigeon, a relatively slim build with a rather long tail, medium-short wings, a small bill and a jaunty Lapwing-like crest.

Its head is medium grey, its throat, breast and underparts pale grey. The sides of the lower neck and upper breast are salmon pink. The upperparts are drab brown with a subdued bronze-green gloss. Most wing coverts are strongly barred, each feather being pale purplish brown with a black subterminal bar and a pale fawn tip. Those parts of the greater coverts and inner secondaries that are visible when the wing is folded are, respectively, iridescent green and iridescent purple, in each case the glossy part of each feather being bordered with white. The primaries are dark greyish, the third from outermost being very short and narrow and generally thought to be responsible for the peculiar whistling rattle made when the bird is in flight. The central tail feathers are dark drab, dully glossed with green and with narrow white tips, the outer tail feathers are dark, glossed with bluish, purplish or greenish and with broad white tips.

The eyes are orange, reddish orange, or yellow; the orbital skin pinkish red as are the legs and feet, the bill is blackish, greyish at the base.

The sexes are alike, the juveniles are duller with only slight iridescences in wings and tail.

In 'the field' at a little distance this pigeon looks an almost uniform light grey and this general colour, combined with its distinctive flight and longish tail at once identify it. The flight is partridge-like, consisting of several rapid wing beats followed by long glides during which the wings

are held more or less horizontal (not downcurved like a partridge's). This type of flight is shown by other species of the bronzewing group, *Geophaps* and *Petrophassa*, which are much less arboreal than the Crested Pigeon, suggesting that the latter, or rather its ancestors, may once have been even more terrestrial in habit than it now is.

The Crested Pigeon is found throughout most of Australia except the heavy rainfall areas and east of the Great Dividing Range. It inhabits various types of more or less arid and (by European standards) fairly open woodland, open arid country with some shrubs or trees and cultivated areas provided there is some scrub or tree cover. It is never normally found far from water and, like the Common Bronzewing, habitually uses artificial sources of water such as dams and cattle troughs. It has increased its range as a result of the opening up of dense woodland and provision of water supplies by man but does not seem to have been able to adapt to urban or suburban conditions, where the introduced feral pigeon, Spotted Dove and Laughing Dove are the common members of this family.

The Crested Pigeon feeds and spends much of its time on the ground. It feeds mostly on seeds, including those of various herbs and grasses and mulga trees *Acacia* sp. The seeds of the weed Patterson's Curse *Echium lycopsis* (formerly *E. plantaginum*) is often a major food. Small bulbs, leaves of trefoils and other greenstuff, small snails and other small invertebrates are also taken.

It has long been kept and bred with some success in captivity, yet not, sad to say, sufficiently so to have become widespread and abundant in a captive state, far less to have become domesticated as has its smaller compatriot the Diamond Dove *Geopelia cuneata*.

Many attempts to introduce it at liberty into Britain and other European countries have been made but all have failed, nor has it been successfully introduced elsewhere though this has been tried in Hawaii, New Zealand and the USA (Lever, 1985). Nicolai found that the Crested Pigeons that he tried to keep free flying in Germany were invariably killed sooner or later by Tawny Owls. If I remember rightly, our former and much missed member the late Duke of Bedford had similar experiences with this species and with Laughing Doves *Streptopelia senegalensis* when he tried to keep them at liberty.

Nicolai (1969) recommends that Crested Pigeons should be fed on white millet, canary seed, maw seed, hemp, wheat, dani and greenfood. I have no personal experience of keeping this bird but hope that some of our members who have will give us further information.

Frith (1982) says that this species comes to water at all times of day but possibly this is only when the water supply is conveniently near or the birds not endangered when visiting it. Those Crested Pigeons that I was able to watch, in 1965, at two different localities in inland South Australia,

mostly came to drink in the early morning, about 30 to 60 minutes after sunrise. A few, however, probably different birds, came in the evening but while it was still light, before the Common Bronzewings came to the water. Those Crested Pigeons that I watched usually showed signs of fear when coming to drink. They usually arrived in pairs or small parties and tended to sit about on trees near the water, while their numbers grew, uttering distress calls, until a bold individual, or an extra thirsty one, flew down and began to drink when its example was at once followed.

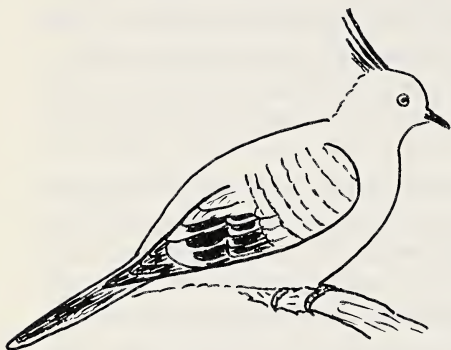
As they first put their bills to the water, many slightly tilted and spread their tails, a flight intention movement. Those that were drinking from natural water (Cooper's Creek) often waded in and drank with their breast and belly in contact with the water but I never saw one bathe. All those that came in the morning appeared to have empty crops and they drank so deeply as to fill the crop with water as could clearly be seen from the profiles of those leaving the water. I may say this was at a time and in an area where it was very hot in the middle hours of the day.

When nervous at the proximity of a human being, wild Crested Pigeons (I say 'wild' as I do not recall seeing the same behaviour from specimens in zoos) repeatedly make a quick 'hitching up' movement of one wing. This appears to involve a slight opening and lowering of the wing which is then quickly flicked back to its normal position. This is seen in some other pigeons as an apparent comfort movement but in the Crested Pigeon and the Common Bronzewing it appears to be compulsive when there is apparent conflict between fear and whatever impulse prompts the bird not to fly further away.

The Crested Pigeon is usually seen in pairs or small parties but may aggregate into flocks of up to about a thousand birds (possibly more but I speak of what I have seen) in good feeding areas or near water in a dry season.

In what is probably an escaping behaviour pattern, normally used in reference to birds of prey, the Crested Pigeon flies at great speed to a thickly foliated tree or bush and plunges into it. This may, but rarely, be done when the bird is disturbed by man, especially just before dusk. Much more often, Crested Pigeons that I disturbed would fly *down* to and perch on a bush or shrub and then make repeated movements in which the head was lowered and the bird appeared to peer into the bush. These gave the impression of being intention movements of entering and hiding although if I then approached closer the bird would fly away.

Earlier in this article I have referred to the partridge-like flight of this bird but had perhaps better add that when it is flying *upwards* the wings are, as one would expect, beaten continuously, and when flying slowly



Crested Pigeon - normal posture



Male Crested Pigeon at intermediate point (near highest) of bowing display. From a photograph. (The tail is spread but this is not visible in profile).



Lowest point of bowing display, as seen from front
(A very rough sketch!)

only one wing beat may intersperse the glides. It walks and runs rapidly.

The nest is built in a tree or bush, preferably a thick and prickly one (Frith); it is the usual pigeon's nest of twigs and similar materials. Two white eggs are laid. They may breed at any time of the year but least often in winter (May to July).

The advertising *coo* sounds to my ears a soft, plaintive but rather musical *coo-oo* or *oo-roo*, subject to some individual variation. Frith, on the other hand, describes it as a quite loud, single note. The display *coo* is short and grunting. The nest call is a soft, rapidly repeated double *coo*. The distress call is a short, panting *coo*, more musical and less grunting than that of many pigeons.

In the bowing display of the Crested Pigeon there is relatively little inflation of the neck, or what there is is masked by the general erection of the body plumage, the wings are partly opened and tilted frontally and the tail raised and spread so that the iridescent areas on wings and tail flash fully into view. There is also, at least when the display is given at full intensity by a bird on the ground, a side-to-side rocking motion caused by the displaying bird raising its feet alternately. In this display, as in other sexual and aggressive contexts, the crest is laid flat or nearly flat, although at other times it is kept erect.

The bowing display is given in threat or defiance as well as when courting a female. Unlike some other pigeons in which the bowing display is used also in aggressive contexts, such as the Rock and Domestic Pigeon *Columba livia*, and the Speckled Pigeon *C. guinea*, only the cock Crested Pigeon (*vide* Nicolai) gives the bowing display which can, therefore be used by the aviculturist to sex his birds.

When nest-calling the Crested Pigeon's wing twitching consists of a series of quick movements, then a pause of longer duration before the next series of movements. A clear example of how, in this and many (perhaps all?) pigeon species the wing movements given when nest calling are in the same tempo as the usual wing movements in flight.

The display flight consists of flying up at a steep angle, loudly clapping the wings and then gliding steeply down again, often in a half circle.

I have only once seen copulation in this species. The cock gave the bowing display, the hen walked away from him, he followed still displaying. She turned, ran to him in a crouching posture with lowered crest, and reached her bill, with nibbling movements into his neck feathers and over his neck while he was still in the act of bowing. She then solicited, crouching with retracted neck like many (but not all) pigeons do. The cock walked round her a few times with lowered crest, then mounted and copulated. He dismounted in front of the hen, walked a little way from her, then turned and each ran to the other in precisely

the same manner as the hen had previously done. With nibbling movements they reached their bills towards each other's, bill-fenced, then allopreened each other's necks and then relaxed.

The line sketches are just to give some idea of the bird. They have no pretensions to art or detailed accuracy. There are *good* drawings of displays and postures of this species in Frith's book.

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LEVER, C. (1985). *Naturalised Birds of the World*. Harlow, England,
NICOLAI, J. (1969). *Tauben, Haltung-Zucht-Arten*. Kosmos, Stuttgart, Germany.

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GROWTH AND DEVELOPMENT OF CAPTIVE-BRED ABYSSINIAN GROUND HORBILLS *Bucorvus abyssinicus*

By CELIA K. FALZONE
(Research Technician, Dallas Zoo, USA)

Abstract

Eight Abyssinian Ground Hornbills have been reared at the Dallas Zoo using two of three established methods, parent-rearing and shared-rearing. Growth and morphological changes were recorded for each chick and supported by information from the San Diego Wild Animal Park, the Walter D. Stone Memorial Zoo in Boston, and Abilene Zoological Gardens. From this data, a comparison of growth rates and a characterisation of morphological development were achieved.

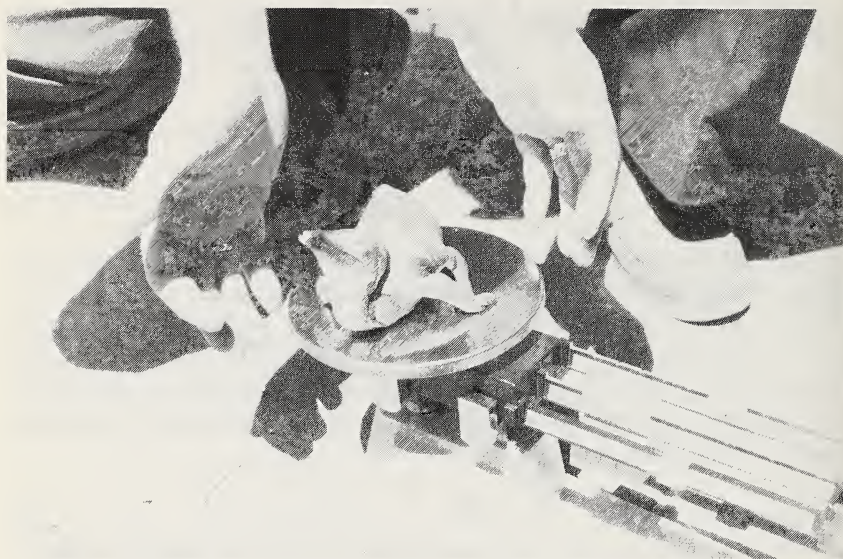
Rearing techniques

Three techniques have been successfully used in the rearing of Abyssinian Ground Hornbills. These are parent-rearing, shared-rearing (both used at the Dallas Zoo), and hand-rearing. These methods allow captive rearing under varying circumstances. To make comparisons in growth and development, information was gathered throughout the nestling period. Chicks in the nest or incubator were regularly weighed. Linear measurements and photographs were also taken to document development.

In 1981 the Dallas Zoo's Abyssinian Ground Hornbills hatched and reared their first chick. The birds were tolerant of human intrusion so the chick was removed from the nest regularly for measurements and inspection. The mother normally waited in the nest for her chick to be returned. Four Hornbills have now been reared by their parents at the Dallas Zoo.

Two chicks hatched five days apart in 1982. With such a difference in age, it was likely that only one would survive without human intervention. The older chick was removed and placed in a brooder for hand-rearing. After a week, the older chick was replaced in the nest and the younger one was removed. This process was repeated weekly until the chicks fledged. With this method of shared-rearing, both chicks were able to survive and both received contact with their parents.

Total hand-rearing has not been necessary at the Dallas Zoo but has been accomplished elsewhere, allowing comparison of growth rates under the three methods.



Dallas Zoo

(top) Five-day old Abyssinian Ground Hornbill chick being weighed to monitor growth; (below) 16-day old chick with eye partially open, feather development beginning, and subcutaneous air giving it a "puffy" appearance.

FIGURE 1
MODEL GROWTH CURVE

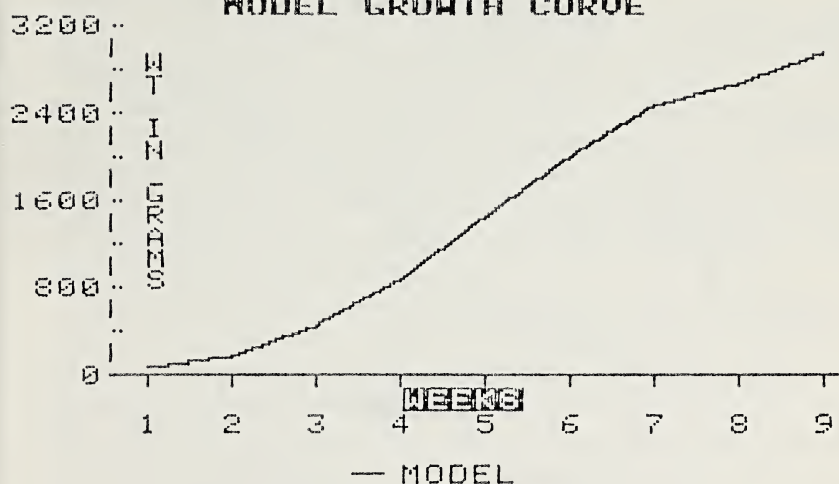


FIGURE 2
PARENT VS MODEL

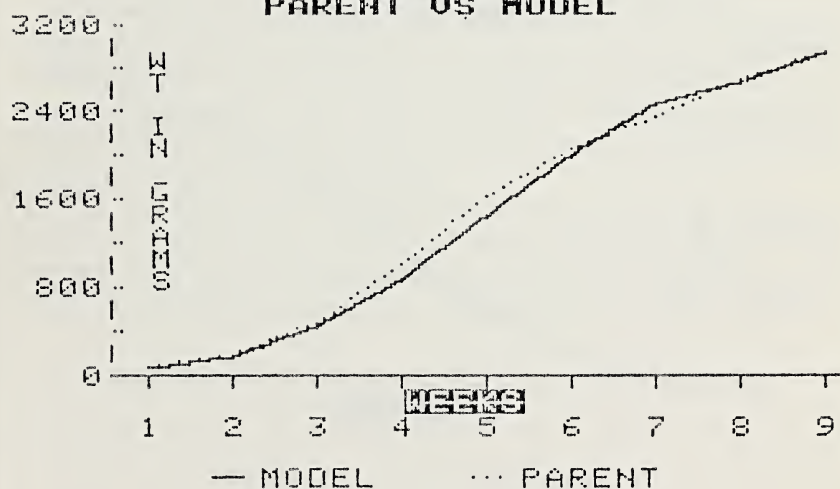


FIGURE 3
SHARED VS MODEL

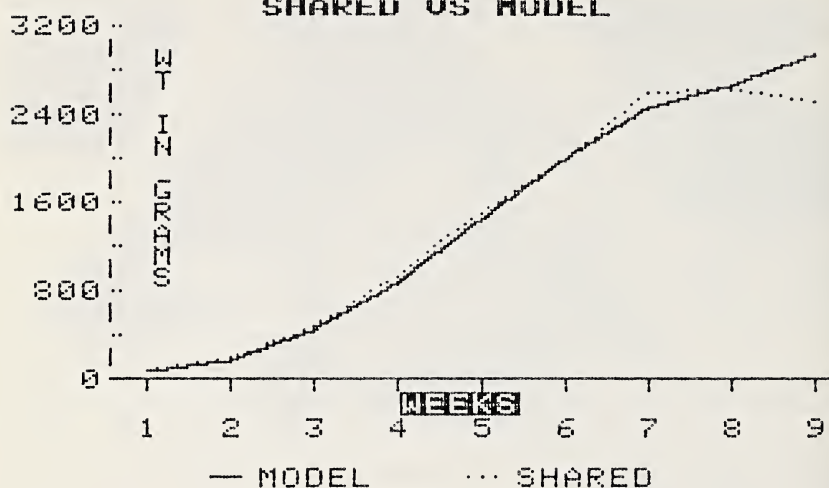
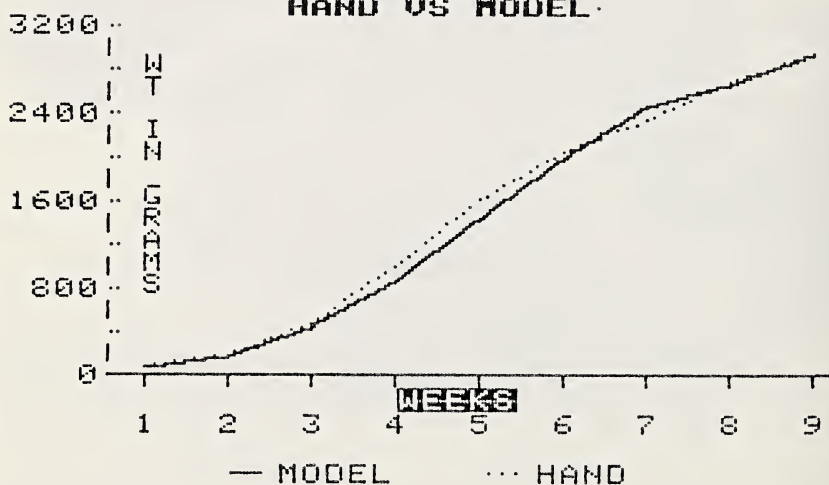


FIGURE 4
HAND VS MODEL



Growth and development

The incubation period for the Abyssinian Ground Hornbill is about 38 days among captive birds. Emergence from the shell may require two days from first pip. At hatching, the chick is pink and the pterylae are evident, especially along the lower back and crown. The dark grey beak is tipped with cream and the lower mandible is approximately 3mm longer than the upper. The hatching weight for 16 chicks averaged 69.7g.

After an initial loss, the weight gain is rapid. Regular measurements of morphological features (culmen, wing chord, tarsus, etc.) further marks the fast rate of development.

The skin colour immediately begins to change and is dark purple by the end of the first week. At this time, the eyes have begun to open and the pterylae have become more defined. By two weeks, feathers are erupting from their sheaths and feather growth accelerates rapidly. When three weeks old, the eyes are fully open and the mandibles meet distally. The chick is becoming well feathered, the eyelashes are prominent, and the feet grip well. Weight gains average 75g per day from four to six weeks, and begin to level off at seven weeks. Chicks exceed adult weight before fledging at two to two-and-a-half months old. At this time, they are capable of limited flight but frequently return to the nest.

Conclusion

Comparison with the model growth curve indicates that the different rearing methods approximate normal growth. The shared-rearing method allows both chicks to socialise with the parents during the nestling period. This interaction promotes normal social growth and chicks reared in this manner have become only mildly humanised, exhibiting normal behavioural patterns. The calm nature of these captive-bred birds will, later, facilitate the study of their offspring.

The continuing study of the Abyssinian Ground Hornbill will lead to a better understanding of its growth from development within the egg through adulthood. This understanding will aid the management of this species and possibly that of the other hornbill species as well.

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A CASE OF MISTAKEN IDENTITY?

By ROBIN L. RESTALL
(London)

There have been several cases of mistaken identity among species of imported birds offered for sale recently, and it occurred to me that a few notes on the subject might be helpful. The problem is manifest in several ways, and the following list covers them all, I think.

1. Misidentification at country of origin

The shippers of birds from, say, Tanzania or Peru are *not* usually experts on what birds they are supplying. This might come as a surprise to some readers but it is true. In recent years I have visited bird markets in Latin America and all over Asia Pacific and have also visited shippers' holding stations in many countries. I have found the professional shippers to be varied in their knowledge of particular birds, usually quite expert in their area of particular interest (which seems most often to be parrots), in South-East Asia they are often reasonably knowledgeable in the case of local softbills. Very seldom are they knowledgeable on seed-eaters, and it is with seed-eaters that we find the most cases of mistaken identity.

2. Confusing country of shipment with country of origin

Birds fly around the world, in every sense! In a recent case of a mysterious 'yellow-billed seedeater' from Mexico, the confused dealer in this country - believing the birds were of Mexican origin because they were shipped from Mexico - identified them as something completely wrong. There is no doubt that the birds came from Peru but the only way the dealer could have known that is if he had been an expert on all Latin American finches, or had referred to field guides of the birds from Colombia and Peru. This problem is often encountered when birds are imported from Hong Kong where shippers assemble their stock from all over the South-East Asian region, or maybe even further afield than that.

3. Incorrect identification in quarantine

When birds come in under a collective name (i.e. bulbuls, firefinches, buntings) or a catch-all like 'common seedeaters', it is incumbent upon the importer to identify them. It is amazing how often it is extremely difficult to identify some birds. I myself have sat for an hour or more in a quarantine station, with two dozen books by my side, attempting to identify some species or other.

Occasionally I am asked to visit a quarantine station to help with identification. On other occasions I am intrigued - or excited - by an unusual name on a trade list or in an advertisement in *Cage and Aviary Birds* and I will call the importer to get further details. I can only remember one instance when I was totally stumped with a finch. The importer had received a couple of dozen *Sicalis* from Peru, listed in the shipper's manifest as Saffron Finches and Raimondi's Finches. The problem arose not from the plumages, which suggested that they were all Saffron Finches *S. flaveola* in juvenile and first year adult plumage (no full-coloured adults) but from the sizes. The birds ranged in size from 5 in to 6½ in (0.13 to 0.17m) in length. Very reluctantly we decided that they were probably all *S. flaveola* but from different parts of the western side of the Andes.

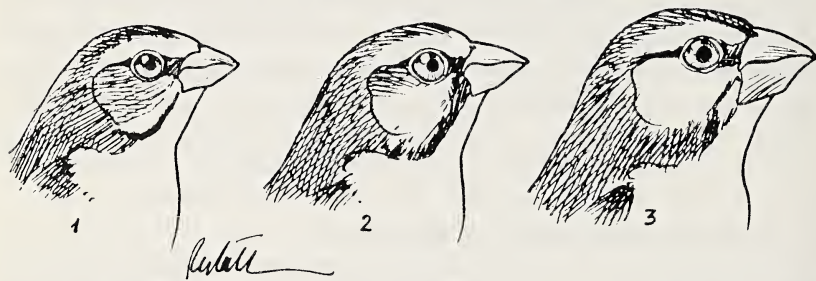
4. Incorrect identification by the retailer

This is where the problem usually impacts upon readers of *Cage and Aviary Birds*, because it is in the advertising columns where the 'yellow-billed seedeaters' and 'white-bellied manakins' appear - not to mention the 'Giant Green Singing Finch' of recent dispute between two giants of aviculture (Bryan Peck and Jeffrey Trollope).

My lifetime's passion is seedeating birds. I have kept finches since 1947 and have been interested in every aspect of them all my life. In 1972 I was so concerned with the confusion between common names and the obvious confusion it caused among aviculturists that I was moved to write a book that covered every finch then known to aviculture, and every common name given to each one. The index of common names was so comprehensive that it extended to 20 pages. In researching the list I was struck by the overlapping of English names, when different species are given the same common name (Blue Grosbeak for *Cyanocompsa cyanea* and *Guiraca caerulea*, Masked Weaver for *Ploceus intermedius* and *P. velatus* are but two examples). Nonetheless, some of the naming is quite misleading. By and large I do not blame retailers. It is not right to say that they use over-colourful or inflated names in order to push up the price (although some undoubtedly *have* done so) because I have seen quite rare birds advertised at very low prices on occasion.

A good example of misnaming is the 'Giant Green Singing Finch'. What a pity the trade ever caught on to this one. Could it be that somebody thought it would appeal to the baser showman's instinct - bigger is better? The fact is that both *Serinus sulphuratus* (known alternatively as the Sulphur-coloured Seedeater, Brimstone Canary and Bully Seedeater) and *S. flaviventris* (also known as the St. Helena Seedeater, Yellow Canary, Yellow Seedeater, Yellow-billed Seedeater, and Marshall's Canary) have been advertised as Giant Green Singing Finches. Could it be that the im-

porter or the retailer do not know which species it is, and thus are covering themselves? It is always possible. There always has been confusion in identifying serins, and nowadays there are many more species available than ever before and it is almost impossible to have a library that will enable you to identify all with certainty. My sketch shows the essential difference between the three species in question (adult males).



1. Green Singing
Finch
Serinus mozambicus

2. Yellow Canary
S. flaviventris

3. Bully Seedeater
S. sulphuratus

All three of these serins are sometimes called Green Singing Finches

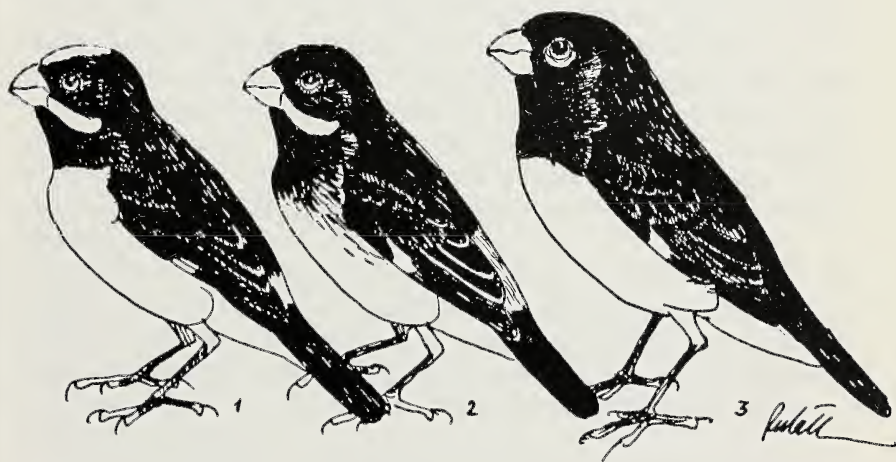
Earlier I referred to the Yellow-billed Seedeater. The retailer in question had searched his two books on the birds of Mexico and, based on a concise *written* description had decided that the birds were *Sporophila schistacea*. This is a medium-size *Sporophila* that is found in northern South and Central America, and an adult male in breeding condition does in fact, have a yellow bill. However, the birds in question had brown undertail coverts (*S. schistacea* has white undertail coverts) and white patches on the tail. Clearly these birds were not even *Sporophila*. I was able to identify them as *Catamenia analis*, known as the Band-tailed Seedeater. The shipment, typical of most from Mexico, contained only male birds which is very sad because to my knowledge none of the *Catamenias* have ever been bred in captivity, and in my experience with them, they settle in very well.

The Cloth-ears Syndrome

The final reason for misleading English names for birds in the advertising columns can only be explained by what I call the cloth-ears syndrome; the person hearing the name misheard it, and wrote down something else. How else can one explain the recently-advertised Silver Eared Messiah? This is more obvious than most, and strictly speaking is more of a challenge to the sense of humour of the reader than a risk of serious misunderstanding. However, when I referred to the 'White-bellied Manakin' earlier, I

was serious. I have been searching for the White-bellied Munia *Lonchura leucogastra* for a couple of years now, anxious to compare it to other allied species and none of the literature is very helpful in this. So every-time I see it advertised I follow up carefully. The African munias are usually referred to as mannikins, but a manakin is a very exotic little bird of the family Pipridae, nearer to a Cock-of-the-Rock than any finch. The 'White-bellied Manakin' turned out to be the Striated Munia *Lonchura striata*. Another species that is occasionally imported, the Black-rumped Munia *L. leucogastroides* is usually called the Striated Munia, a classic case of innocent downgrading. The Black-rumped was little known and had not been bred in Britain until last year and was surely worth more than the commonly-imported *L. striata* which has been bred often.

In a recent article, Bryan Peck described the confusion between the races of the Lined Finch *Sporophila l. bouvronides* and *S. l. lineola*. There is a third species of black-and-white seedeater also imported from Peru, the Black-and-White Seedeater *S. luctuosa*. I hope my sketch makes it very clear which is which.



1. Lined Finch
Sporophila lineola

2. Lesson's Finch
S. bouvronides

3. Black-and-White seedeater
S. luctuosa

Incidentally the *bouvronides/lineola* complex has never been studied exhaustively, although Paul Schwarz probably did more field work on the subject than anybody. His last set of field notes were impounded by the government of Venezuela when he died and have not yet been studied by a competent ornithologist. He concluded that the two were sibling species. The *S. luctuosa* can be identified absolutely by the white crescent beneath the eye - a diagnostic feature not shown in the books because it disappears when the skins are preserved as museum specimens.

In the 15 years or so since writing my check list of common names, I have lived in four different continents and have first hand experience of very many more finches than I ever dreamed possible. In the four years since returning to England I have seen an increase in the variety of finches available, many of which were unknown outside the field guides only a few years ago. I am working on a new check list based book but this will be a couple of years in the making.

Meanwhile, if any reader has any favourite confusions among the finches, I will be happy to discuss them and provide diagnostic illustrations for the benefit of all readers.

* * *

LEEDS CASTLE AVIARIES A MEMORIAL TO LADY BAILLIE

By KEITH MITCHELL
(Leeds Castle, Maidstone, Kent)

As the many thousands of visitors to Leeds Castle will already know, Lady Baillie, who bequeathed Leeds Castle to the Leeds Castle Foundation on her death in 1974 was a very keen aviculturist. Although she kept many species of parrots, softbills, finches and waterfowl, her main interest lay in the Australian psittacines. These were housed in 140 very long aviaries in the conventional construction of the 1950s and 60s, together with cockatoos and other large parrots. Lady Baillie was one of the first to own the blue mutation of the Indian Ring-necked Parrakeet and this species has been bred in the collection for a number of years. Australian King Parrots and other broad-tailed parrots, as well as Princess of Wales' and other shaft-tailed parrots, and many species of Rosella such as the Brown, were kept in the adjoining aviaries.

As the reader will realise, this collection was built up for the pleasure and enjoyment of one person and although the aviaries remain adequate for the birds to live and breed in, the access and walkways proved inadequate for the public. Plans were made to build new aviaries in line with modern thinking, both from the public's viewpoint and the practical side of bird management. The design of the aviaries themselves is quite unlike any other in this country. No expense has been spared on the use of construction materials so that the buildings will require minimum servicing in future years.

The main aviary structures were completed on 31st March and the public was admitted on 3rd April 1987. since then these new aviaries have received many compliments from the general public for their spectacular design and beautiful setting in 500 acres of rolling parkland. Aviculturists who enjoy species of rare and endangered birds have been very pleased with this new facility.

The birds' welfare, both physical and mental, has been of paramount importance in the design of the aviaries. Although the construction is finished, the new bird garden's 48 purpose-built aviaries will continue to evolve until the collection is well-balanced and productive. There is also an area for large terrestrial birds, planted with trees and shrubs and with a large pond with running water purified by a sophisticated filtration system. Approximately one half of the aviaries have concrete floors covered in large pebbles to facilitate easy cleaning and all debris can be

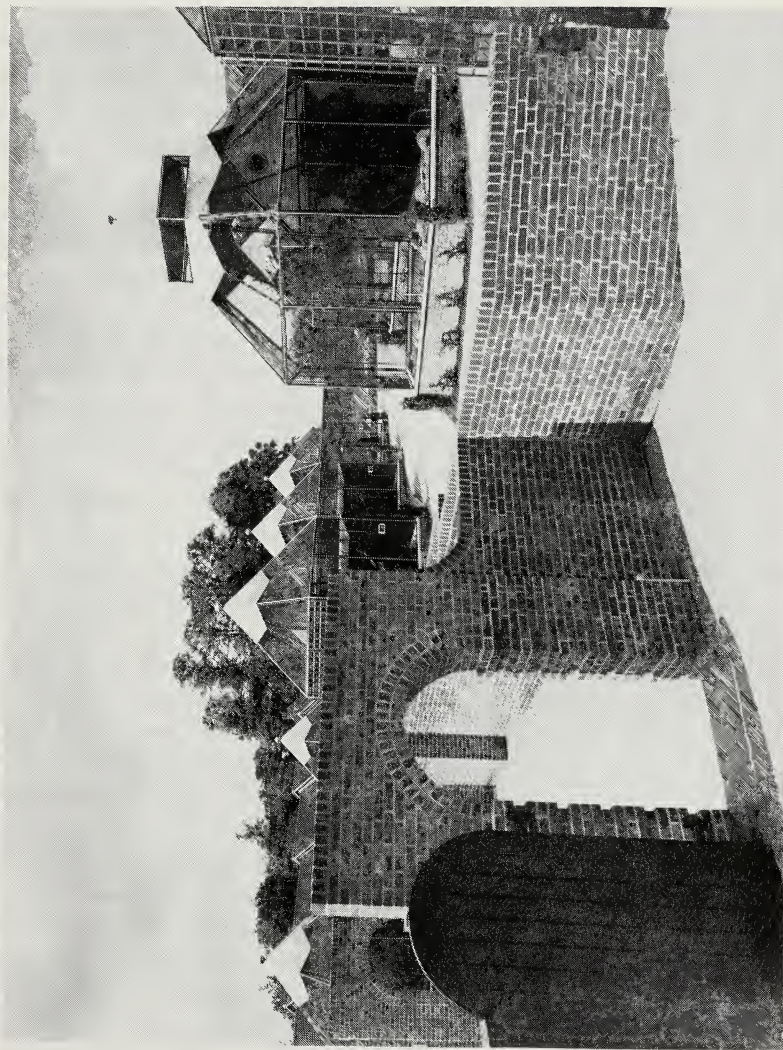
hosed down to a drain within each aviary. These flights have rock ponds some of which are supplied with running water from miniature waterfalls. This is particularly important as many birds will bathe several times a day if the water is inviting, which in turn leads to better breeding success and improved feather condition. The pools can also be emptied from outside using a valve which empties three or four aviaries at one time.

Nest-boxes and barrels are situated in most cases in the inside shelters. This will not only protect the boxes from the elements but also provide the dark environment that many of these birds, particularly the South American stock, seem to prefer. The birds are fed from trays fitted to the stable-type doors on each aviary shelter. This enables the keepers to perform the daily routines from outside the flights via the inside service hallways. The lighting in these shelters is connected to automatic dimmers so that light levels can be adjusted to suit the birds' needs, particularly during the winter months.

Breeding obviously comes very high on our list of priorities and we are very aware that birds need to feel that their territory is secure without the threat of encroachment in order to achieve any sort of breeding success. There is a common theory that zoos do not breed birds well. The new aviaries which are to house our softbills are over 15 ft (4.57m) high and we are finding that this extra height gives the birds an added feeling of security, as they can maintain their own flight distance from the public if they feel the need. The upper reaches also provide an excellent site for nest-boxes which the birds can use with no risk from predators.

Great care is taken in the preparation of the diet to ensure that all the birds' nutritional requirements are met. The parrots are receiving only a very small proportion of dry seed as the bulk of their diet is made up of sprouted seeds, pulses and chopped fruit. We believe this diet has proved itself as many of our birds have attempted breeding this year and stock that had previously laid a two-egg clutch in the past has increased this year to a three-egg clutch. The softbills are fed a wide range of fruit and vegetables, care being taken to accommodate individual likes and dislikes and at the same time not to feed any one item in excess.

The collection already includes many noteworthy species including Palm, Red-vented and Leadbeater's Cockatoos; Hyacinthine, Red-fronted and Scarlet Macaws; Keas; Violaceous Turacos, Royal Starlings, Banded Aracaris, Crowned Plovers and other softbills. Our turacos are housed in a large aviary supplied with many perches. This perching arrangement allows the birds to demonstrate the unique natural behaviour displayed by turacos, rapidly scurrying up and down branches. Their feet are equipped with a third toe that can be pivoted to give a two-forward and two-back or a three-forward and one-back arrangement to provide the bird with the best possible control on any surface that it may perch on.



The new Aviaries at Leeds Castle, 1988

H.A.M. Photography

Care has also been taken in labelling the exhibits. Each graphic plate consists of a high quality photograph taken by well-known wildlife photographer David Hosking. This photograph is accompanied by comprehensive details of the range, habitat, habits and nesting. This information is contained within a specially designed frame, thus making the finished product attractive and informative.

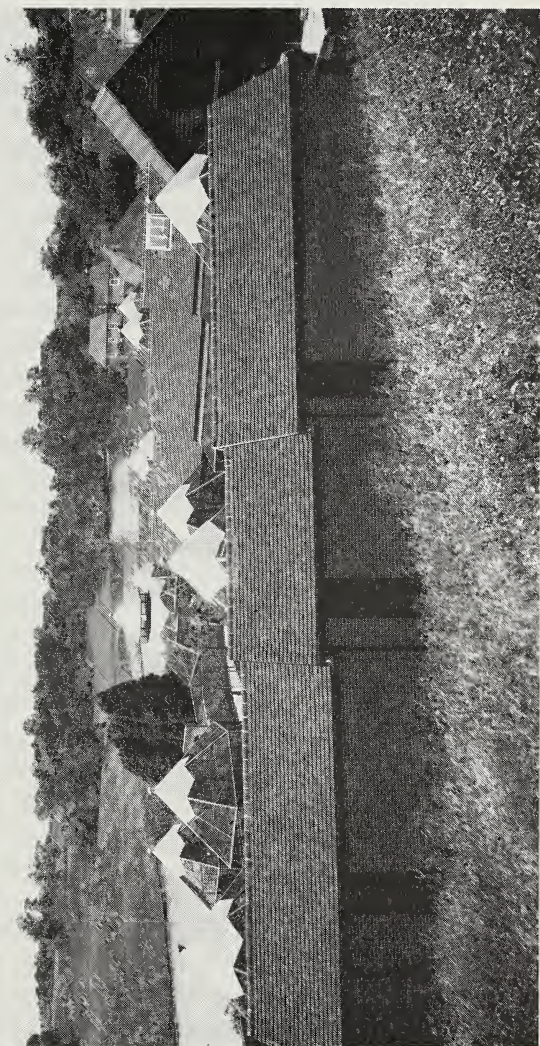
All birds that are sexually mature have been supplied with nesting facilities. All monomorphic species have been surgically sexed and compatible pairs installed in the aviaries to give us the best possible breeding potential. During our first season in 1987 we did not expect to achieve great breeding successes but were very pleased to have Scarlet Macaws, Little Corella Cockatoos, Spreo Starlings, Port Lincoln, mutation Quaker and Splendid Grass Parrakeets, Kakarikis and various Australian finches surprise us with young, some even going down for a second clutch.

We have certainly tried to consider every eventuality. Should any of the large parrot species prove unreliable as parents we are fully prepared to hand-rear their young and this, of course, will encourage a second clutch. With this in mind, the incubator room has been purpose-built with all necessary support systems. The generator automatically cuts in if power should fail and surge filters have been fitted to filter out all spikes. An exhaust fan keeps the room fresh as the heater maintains constant ambient temperature. This room is even hooked up to the alarm system so the keepers are called at home by central station if all else fails. Specially constructed forced air, thermostatically controlled brooders await any chick that must be hand-reared.

On the educational side there will be 'behind the scenes' tours which will incorporate the incubator, nursery, kitchen, hospital and holding rooms. The kitchen is fully equipped and would make most housewives envious. The utmost care is given to constructing diets for all of the birds as this obviously plays a very important part in bringing the stock into breeding condition.

As visitors stroll through the lovely wooded garden towards the Castle, they come upon our duckery which is currently under extensive renovation. This duckery contains many rare species of exotic waterfowl. A large group of flamingos will be a focal point as our visitors enter this area, followed by a breath-taking view of the Castle. The water flowing over the beautiful cascade is diverted from the River Len, supplying fresh water for the birds throughout the year. The duckery is teeming with large carp eager to take a morsel from the visitor.

This collection will be in a constant state of change for the next year or so as we find species that are best suited to our particular environments. We have no doubt that within that period, we will build a well-



General view of the Aviaries, showing their setting in the parkland of Leeds Castle

H.A.M. Photography

balanced mixture of avifauna, including parrots, softbills, and terrestrial and arboreal birds. There is no doubt that this collection will grow to be self-sustaining and contribute to the captive breeding pool of the birds represented here.

Leeds Castle Foundation, a registered charity, is indebted to the individuals who contributed their time and expertise to this development. Naturally at the top of this list is Lady Baillie to whom these aviaries are dedicated. The collection she kept was interesting and varied, and many aviculturists have fond memories of visiting Leeds Castle and its birds.

Many people assisted with the original planning of this new facility. Raymond Sawyer has been a great friend and has helped all along the way. We have certainly enjoyed his great sense of humour and his vast knowledge of birds, plants and aviaries and how to present them properly.

Andrew Grant, the Managing Director of Leeds Castle, has directed all of us in this endeavour to revive the collection and the history it represents.

Rosemary Low and Robert Grantham should be mentioned for assistance in the original planning, together with James Dolan, General Curator for San Diego Zoo, California. The architect, Vernon Gibberd has learned a great deal about the keeping of birds and enough cannot be said for his unique design.

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A DISPLAY BY TRAINED BIRDS IN BEIJING, CHINA

By SIMON STIRRUP

(Cambridge)

On 10th November 1986 I witnessed a bird display at Taoranting Park in the Xuanwu District of Beijing (Peking), China. The display area was screened off and a small entry fee, about 2p, was charged. A variety of passerines were tethered by their necks to perches located in a roped-off corner. This method of attachment seemed to cause the birds distress as many individuals spent much of their time pecking at the string and metal leads. The species involved were: Mealy Redpoll *Acanthis flammea*, Siskin *Carduelis spinus*, Red Crossbill *Loxia curvirostra*, Hawfinch *Coccothraustes coccothraustes*, Japanese Grosbeak *C. personata* and Oriental Greenfinch *Carduelis sinica*. Caged, but not on display, were two Zebra Finches *Poephila guttata*. The single Redpoll had a white feather fastened to the back of its head to form a crest.

At intervals birds were removed from their perches and taken to a roped-off display area. Here their tricks were accompanied by a megaphone-delivered commentary. The following displays were observed:

- i) Removing pieces from a suspended paper lantern and flying with them to owner's hand. Only performed by a Siskin;
- ii) Catching perforated plastic ball rolled along ground and returning with it. Performed by Oriental Greenfinch;
- iii) Similar trick to above, except that ball caught in mid-air when thrown vertically. Performed by Siskin;
- iv) Small coins removed from the fingers of the audience and taken to owner. Performed by Siskin and Crossbill;
- v) Opening wooden box and extracting plastic items from inside. Performed by male and female Crossbills.

As far as could be ascertained, all the birds, apart from one Crossbill, were males.

In addition to the passerines, there were also three tethered Golden Eagles *Aquila chrysaetos* and a Eurasian Sparrowhawk *Accipiter nisus*. The Sparrowhawk was used to attract the audience into the display area by being frequently taken outside sitting on a wrist. It was certainly a very interesting experience and I must say that I was quite impressed with the displays. It was good to see that all the birds were in good condition.

REVIEWS

THE HISTORY OF THE BIRDS OF BRITAIN

Illustrations by David Reid-Henry, text by Colin Harrison. Published by Collins, London, in association with H.F. and G. Witherby. Price £14.95.

New books on British birds continually appear. Not all are good value for money but this one most decidedly is.

The 48 colour plates and the numerous sketches of birds are by our late member, Mr. David Reid-Henry (signs D.M. Henry). This, to all who know his work, is sufficient guarantee of their excellence and beauty. The foreword, by Albert Earl Gilbert, quotes from a letter by the artist in which he expresses his regret at sometimes having to paint birds that he has not seen and studied in life and his statement: 'Much that I did in earlier days I can now fault,'. Few others would, I imagine, venture to find fault with any of David Reid-Henry's work though it is true that a few of the paintings in this book are not so superlatively excellent as the majority and give the impression that he may not, when he painted them, have been familiar with the species in life; the Eider Duck struck me as an example of this.

All in all, however, they have the combination of beauty and accuracy of detail that we look for, and never fail to find, in this artist's work.

In his preface, fellow member Colin Harrison (happily still very much with us) says: 'In writing this book I have tried to put the birds of Britain into their long term context.' In this he has been entirely successful. I have not only read and re-read the general discussion, which includes sections on 'The Earliest History', 'The Pleistocene', 'Pleistocene Birds', 'The Recent Period', 'Recent Birds', 'Man-modified Britain', 'The Twentieth Century' and 'Final Comment', but also the sections dealing individually with all the species illustrated and some, such as the Mandarin Duck, that are not.

Out of so rich, yet so easily digestible a pudding it is hard to decide which plums to pick out for quotation. How surprised and pleased I was to learn (p. 14) that 600,000 years ago the Mandarin Duck was a member of our avifauna. Let us hope this fact will be used in its defence against those who object to all introductions on principle! As Dr. Harrison points out, if the Azure-winged Magpie did not occur in Iberia, it too would have been thought, as was the Mandarin Duck, to be a purely east Asiatic species.

Even more surprising, a Jungle Fowl once occurred in Britain, though this is not thought to have been conspecific with any presently existing

species. These and other identifications are, incidentally, based largely or entirely on Dr Harrison's own detailed long term studies on fossil bird bones.

The reader will find him- or herself constantly coming on interesting and thought-provoking statements. For example: 'Since the early 1940s there has been an enormously increased use of insecticides of all kinds. These would appear to be reducing the availability of insects in general, and possibly having a greater effect on larger insects with smaller total populations.' (p. 20).

Most writers who touch on bird conservation attack egg collectors, skin collectors, aviculturists and foreign peasants who kill birds for much needed food but express their approval of 'legitimate sport' and its adherents. I was delighted to see that Dr Harrison, on the contrary, makes no bones about what sport has cost us in terms of wildlife (p. 23), though he might perhaps have added that the timidity of so many British birds is mainly or entirely due to them, or their recent forebears, having been so much shot at.

Perhaps the most currently cogent section of the book is Dr. Harrison's 'Final Comment' (p. 25). Old fogies like myself, who recall freer times, view with some disquiet the modern tendency to regard wild birds as creatures found in reserves where entrance is often restricted to those willing or able to pay for the privilege, and necessarily circumscribed. Unlike many modern conservationists, Dr. Harrison is well aware of this problem and truly says 'Things which are rightly or wrongly seen to be available only to a privileged minority are hardly likely to be regarded as the birthright of the population as a whole.'

I could go on quoting from this excellent book but will refrain. I recommend it whole-heartedly to all who are interested in our wild birds, their history and possible future, and to all who delight in beautiful pictures of them.

D.G.

THE DIET OF THE BARN OWL *Tyto alba* (Scopoli) IN NAIROBI, KENYA
By Cecilia M. Gichuki, Department of Ornithology, National Museums of Kenya, P.O. Box 40658, Nairobi. Journal of the East Africa Natural History Society and National Museums. Volume 75, No.187. Published by the East Africa Natural History Society, Box 44486, Nairobi, Kenya.

With the interest and concern there is about the Barn Owl, I feel it may be helpful to bring this paper to the attention of a wider readership.

The study involved the analysis of 1200 Barn Owl pellets, obtained from a nest-site at Karen, a suburb of Nairobi. 4470 prey fragments were recovered and 2262 prey items identified. These are listed in four tables and there is a review of the genera and species identified and some comparison is made with prey recorded during other studies in Africa.

HABITS AND BREEDING BIOLOGY OF THE GREAT BLUE TURACO
Corythaeola cristata. By Mhorag Candy, Kaimosi Tea Estate, P.O. Box 1, Kaimosi, Kenya, is an earlier paper, No. 180, published by the East Africa Natural History Society.

The result of five years' fieldwork, this paper provides a fascinating insight into the life of this, by far the largest of the turacos and one which has proved somewhat problematical to maintain as an aviary bird. Because of this, the author's observations about this species' diet make particularly interesting reading.

Mhorag Candy concluded that the Great Blue Turaco is frugivorous, but buds, shoots, leaves and flowers are included in the diet. Regurgitated leaves are fed to the nestlings from eight days onward, and possibly earlier.

When comparing the breeding behaviour of the Great Blue Turaco with that of other turaco species, it is gratifying to see that the author's reference sources included our own magazine.

Any members interested in purchasing copies of these papers from the East Africa Natural History Society should, I suggest, enquire about receiving them by air mail, for surface mail seems to take an inordinately long time.

M.E.

NEWS AND VIEWS

Professor J.R. Hodges, recently returned from a tour of the Far East, writes:

'The efforts of the Chinese authorities to rid Beijing of sparrows have been so successful that, during a four-day visit to the city, I did not see a single sparrow nor any other wild bird. The few weeks which I spent recently in China, although fascinating in every other respect, were disappointing for a casual bird-watcher but, of course, most of my time was spent in the large cities. I visited some of the bird markets in Guangzhou, Shanghai and Nanjing but these were disappointing and had on offer only Derbyan Parrakeets, Pekin Robins, Zosterops, very brightly coloured Silver-eared Mesias, Blue-winged Sivas and the favourite singing bird of the Chinese, the Hwamei or Brown Laughing Thrush.

'The Botanical and Zoological Gardens in Hong Kong, of which our Vice President Dr. K. Searle is Honorary Curator, is a lovely oasis in a concrete desert. The charming gardens are situated almost in the heart of the bustling city, surrounded by high-rise buildings. The aviaries, which are beautifully planted and well kept, house more than 200 species including such rarities as Bulwer's Pheasants and Manchurian Cranes. Special attention is given to endangered species and the wonderful achievement in rearing to maturity more than 300 Palawan Peacock Pheasants is well known. Less well known are the remarkable breeding successes with the other five species of Peacock Pheasant, and with Rothschild's Grackles, White-naped Cranes, White-winged Wood Ducks, African Pygmy Geese and Count Raggi's Bird of Paradise. I spent several hours gawping with incredulity, amazement and delight at the superb collection with my attention riveted mostly on the Peacock, Bulwer's and Argus Pheasants, several species of Crowned Pigeons and a magnificent pair of Green-winged King Parrots.

'I shall remember Hong Kong not for the splendour of its appearance from the water at night but for the charm of its Zoological and Botanical Gardens.'

* * *

From David Coles:

Being interested in first breeding records, I am always on the lookout for additional species bred in Britain and overseas. I was interested to note, therefore, that in the March issue of the International Loridae Society's Newsletter, Dale Thompson has compiled a list of first breedings of Loridae.

Unfortunately, unlike my list no source reference is given - in such lists it is important to reference the breeding so as to allow others access to the information.

Fruit Pigeons of the genus *Ptilinopus* are not the easiest of Columbigormes to breed so it is interesting to read an account in the South Australian Avicultural Society's journal by Ron Rodda on breeding the Red-crowned *P. regina*. The article in the April 1988 issue gives a wealth of avicultural data.

The May 1988 issue of *Australian Aviculture* contains two interesting psittacine articles, both illustrated with colour plates. One, by Martin Fingland, covers the distribution and status of New Zealand parrots. The other covers the breeding of the Glossy Black Cockatoo *Calyptorhynchus lathami*. The captive breeding project started several years ago in Tasmania is also starting to add hope for this species. Under the charge of Peter Brown, former Curator of Harewood Bird Gardens, a total of nine birds have been reared to independence, although some deaths have resulted from parrot beak and feather disease (PBFD) in both adults and young.

The Avicultural Society receives many magazines in exchange for its own. Most are of an avicultural nature but several are from the world's leading scientific organisations which generally are quite weighty, technically detailed volumes. The *Wilson Bulletin* is one such publication which this year celebrates its centenary. Contained in the pages of the June issue is the recording of a species of *Pyrrhura* conure new to science. The species was first observed in the wild in 1980 but it was not until five years later that specimens were collected and the species named El Oro Parrakeet (Conure) *Pyrrhura orcesi*. It is restricted to a narrow band of forest, between 600 to 1100m elevation, along the western slope of the Ecuadorian Andes. Its range is only ca 100 km in length and, given the current rate of deforestation in the area, it may soon be threatened with extinction. However, the report lists the bird as common. Sixteen specimens were collected for museums - could not the same number be collected to start a breeding programme in captivity?

Over the years, the progress of the Eastern White Stork *Ciconia c. boyciana* has been well documented in the *Avicultural Magazine* and it is pleasing to note that at last Vogelpark Walsrode in West Germany, has succeeded in hatching and rearing four young. (*I.Z.N.*, 34, 4:17).

* * *

From the latest (October 1988) newsletter from Loro Parque, Tenerife, Spain:

'Early October is a quiet time for the birds in the Park, there being a

lull in the breeding activities while the moult is completed. Only a few lorries, Eclectus, *Aratinga* conures, Grey Parrots and lovebirds have eggs or young at the time of writing. A notable exception is a rare species not previously bred at the Park - and three females have eggs! This is the Crimson-bellied Conure *Pyrrhura rhodogaster* from Brazil. The Park's two original birds were both males but two months ago the four more recent arrivals were sexed and found to be females. A trio was placed on exhibit and another trio in our original breeding centre.

'Within four weeks the female on exhibit had eggs, leaving the second female with the male. Two weeks later she too was incubating alongside the other female. Meanwhile, in the breeding centre one female had also laid. We will report the outcome in the next newsletter. This very beautiful bird is rare in captivity. The most striking of the *Pyrrhuras*, it has the entire breast crimson.

'1988 has been a year of great expansion in the parrot collection at Loro Parque; in fact, at no other time has the collection increased so much and we now have a total of 211 species, plus 53 subspecies of parrots.

'One reason for this rapid expansion is the increasing difficulties in importing parrots, whether wild-caught or captive-bred. Few more of the former will be acquired in future; our main source of new birds will be the breeders with whom we exchange our young birds. The majority of those reared at Loro Parque during the past two seasons have been kept for our breeding programme or for exchange with other breeders. Recent exchanges include sending four White-eared Conures *Pyrrhura leucotis* to Denmark in exchange for Pearly Conures *P. perlata*, receiving Red-collared Lorikeets *Trichoglossus haematodus rubritorquis* from Holland in exchange for Duivenbode's Lorikeets *Chalcopsitta duivenbodei* and, in September, we received from the USA two female Purple-capped Lories *Lorius domicellus*, a species now very rare in aviculture, to pair with our two males, a Weber's Lorikeet *Trichoglossus haematodus weberi* to make up a pair, and two pairs of conures not previously represented in the collection: the attractive yellow-faced St. Thomas's Conure *Aratinga pertinax pertinax* and the striking Red-throated Conure *A. holochlora rubritorquis* plus a pair of the Australian Scaly-breasted Lorikeet *Trichoglossus chlorolepidotus*. These latter are now on exhibit, the first time that this species, now rare in aviculture, has been seen at Loro Parque.

'We were especially pleased to obtain a female Yellow-tailed Black Cockatoo *Calyptorhynchus funereus funereus* from California. She was obtained for the single male in the collection, thus we now have true pairs of three forms of Black Cockatoos as White-tails and Red-tails (Banksians) are, of course, already represented in the collection.

'Visitors to the Park should also watch out for some parrots which do not appear on our inventory. These are the birds at liberty. Observant visitors will derive much enjoyment not only from the numerous and conspicuous Quaker Parrakeets *Myiopsitta monachus* but also from those which are more difficult to observe. They include a pair of Senegal Parrots *Poicephalus senegalus* with their two young. They share the nest of Quaker Parrakeets in a palm tree near Loro-vision. One of the most spectacular free fliers is the Alexandrine Parrakeet *Psittacula eupatria* which flew in about eight months ago. His noisy calls constantly alert one to his presence and his long tail makes him unmistakable in flight. He is very bold and can often be seen stealing food from the macaws on the wall near the window of the hand-rearing room.

'The liberty lorries include the much-loved Duskie *Pseudeos fuscata* which follow the food cart and help themselves to fruit. Recently more lorries have been released and these include two hybrid Black-capped x Yellow-backed Lories *Lorius lory* x *garrulus flavopalliat* which were reared three years ago. Large and showy, a flash of red in flight - one of them can often be seen with a Green-naped Lorikeet *Trichoglossus h. haematodus*. The hybrids do not fly together!'

CORRESPONDENCE

The Common Bronzewing Pigeon and the Wineberry

With reference to Derek Goodwin's article (Vol. 94: 94) on the Common Bronzewing, the Wineberry mentioned is *Rubus phoenicolasius*. This bears pleasant pink flowers followed by red fruits something under one inch in length. I have not eaten one for years but recall that they were sweet. It is quite a pleasant plant with its trusses of ornamental fruit and its stems covered with red bristles, and would be a useful and ornamental plant for any enclosure. The fruiting stems are removed in autumn in a similar fashion to raspberries.

H.G. Kenyon, Wokingham, Berkshire

AVICULTURAL SOCIETY NEWS

COUNCIL MEETING held on 15th October 1988.

- The Society's Medal was awarded to Mr. R. Wallis for breeding the Bar-breasted Fire Finch *Lagonosticta rufopicta* in 1987 for the first time in Great Britain.
- Mr. J. Trollope was elected to serve on the Council. Mr K. Lawrence was re-elected to serve another term as a Council member.

SOCIAL MEETINGS

The following dates have been fixed for meetings in 1989:

- 18th March and 16th September 1989 - Buffet Lunch and talk at the Society's headquarters in Hartley Wintney.
- Sunday, 4th June, 1989 - President's Garden Party.

It is also hoped to arrange a visit to a collection in April and the Annual Dinner in October.

Details of all these events will be circulated in due course.

AUTUMN SOCIAL MEETING

Some 70 members and their guests attended a buffet lunch on 15th October, 1988, in our new meeting room here at Hartley Wintney. This was followed by a most enjoyable and interesting talk given by Mr. Brian Pettit on the future of aviculture.

Mr. Pettit raised very important and sometimes controversial matters and the discussion that followed was most stimulating. We are trying to persuade Mr. Pettit to summarise his arguments in an article for the *Avicultural Magazine*.

We would be very pleased to hear from any members who can give a talk at one of these social meetings. The atmosphere is friendly and informal with an interested audience. If you cannot give a full-length lecture (about one hour including discussion), then a short talk of 10 minutes or so with a few slides of a particular bird or breeding, etc., would be a most welcome addition to the programme.

Hon. Secretary

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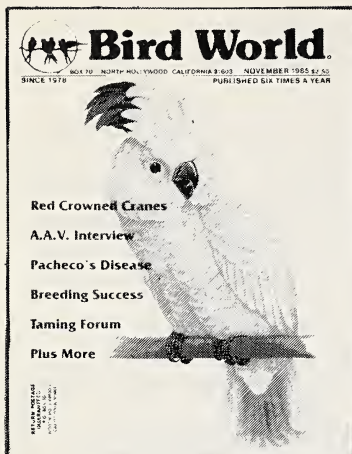
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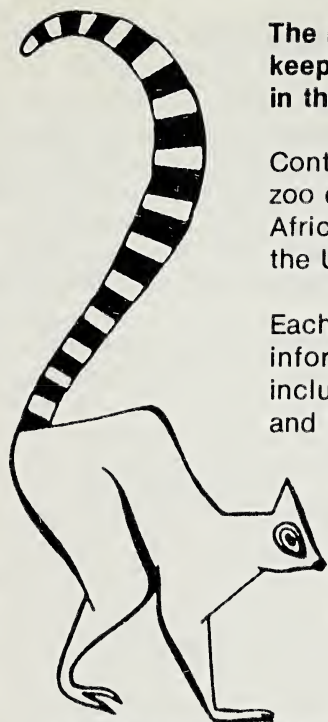
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**We are most grateful to Mr. Brian Reeves for giving up his time to compile this Index so expertly. Ed.*

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